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Twenty-Second Annual Report

OF THE

State Board of Health

OF THE

STATE OF OHIO

FOR THE

Year Ending December 31st, 1907.

COLUMBUS, O.:
F. J. HEER, STATE PRINTER,
1908

LETTER OF TRANSMITTAL.

OHIO STATE BOARD OF HEALTH.

OFFICE OF THE SECRETARY.

COLUMBUS, April 9th, 1908.

To His Excellency, ANDREW L. HARRIS, *Governor of Ohio*:

SIR: — In accordance with Section 8 of an "Act to create and establish a State Board of Health," as amended May 7th, 1902, the accompanying report, which is for the calendar year 1907, is herewith submitted.

Respectfully,

C. O. PROBST,

Secretary.

MEMBERS OF THE OHIO STATE BOARD OF HEALTH.

*Josiah Hartzell, Ph. D., *President,* Canton........December, 1907
Darwin G. Palmer, M. D., *Vice-President,* Geneva....December, 1908
Byron Stanton, M. D., Cincinnati....................December, 1909
J. C. Crossland, M. D., Zanesville..................December 1910
Wm. T. Miller, M. D., Cleveland....................December, 1911
Frank Warner, M. D., Columbus.....................December, 1912
W. C. Chapman, M. D., Toledo.......................December, 1913
C. O. Probst, M. D., *Secretary.*

* Mr. Josiah Hartzell was reappointed.

GENERAL REPORT.

This is the twenty-second annual report of the State Board of Health, and is for the year ending December 31, 1907.

As the report embraces matters included in the annual reports of local boards of health, which are to be submitted on or before the fifteenth day of January of each year, there is necessarily some delay in its preparation.

PERSONNEL OF THE BOARD.

The personnel of the Board remains unchanged from last year. The term of office of Mr. Josiah Hartzell, of Canton, having expired on December 13, 1907, he was reappointed by Governor Harris for a term of seven years.

MEETINGS.

Four regular meetings and one special meeting of the Board were held during the year. The full proceedings of these are given farther on.

MEETINGS WITH LOCAL BOARDS OF HEALTH.

The last General Assembly provided by enactment that each city, village and township should send a delegate, representing the health department, to an annual meeting to be called by the State Board of Health, and pay the necessary expenses of such delegate. The State Board of Health was authorized to call several such meetings, if desired, for different groups of health officials. Accordingly, in January, 1907, a meeting was called in Columbus and health officials invited from all cities and all villages having a population of 3,000 or more, according to the last Federal census.

In June a conference was held in Cleveland, with health officials of villages of less than 3,000 inhabitants and of townships in the northern half of the state; subsequently, in October, a meeting with the same class of officials was held in Cincinnati.

The object of this division was to provide for the discussion of health matters of practical interest to all present. Under former arrangements for such conferences, sixteen of which were held, there was an intermingling of delegates from cities, villages and townships. Many questions of municipal sanitation, such as water and sewage purification, the collection of garbage, etcetera, were of but slight interest to the townships. On the other hand, the subjects of special interest to rural districts and rural health officers were of minor interest to municipal

officers. The past year has shown the wisdom of having separation in these conferences.

All three meetings were well attended, although a good many municipalities and townships failed to send delegates in spite of the mandatory character of the law, for the violation of which, however, there is no penalty.

The proceedings of the January meeting were printed in full, and those of the two other meetings in part, in the *Ohio Sanitary Bulletin,* and distributed among the various boards of health.

As the value of such conferences to the communities sending delegates becomes better understood, we may count on a much fuller representation.

SMALLPOX.

There has been some recrudescence of smallpox during the year. It was reported for 1906 that "A few cases of smallpox appeared here and there, but there was no serious spread of the disease." No serious epidemics of smallpox have occurred during the present year, but the total number of cases reported has been considerable.

The character of the disease remains unchanged, and the percentage of mortality for the cases reported was only 1.08.

The total number of cases reported for the year was 1018, and the deaths, two. These were distributed by counties and places as follows:

Cases and Deaths from Smallpox Reported to the State Board of Health from January 1, to December 31, 1907.

County.	Place.	Cases.	Deaths.
Allen	Delphos	3	....
Ashtabula	Conneaut	3	....
Ashland	Ashland	1	....
	Green Township	3	....
	Ruggles Township	1	....
Auglaize	Moulton Township	7	....
	St. Marys Township	3	....
Brown	Georgetown	1	....
Butler	Hamilton	116	....
Champaign	Adams Township	6	....
Clark	Springfield	1	....
Crawford	Polk Township	1	....
Cuyahoga	Cleveland	11	....
Darke	Franklin Township	1	....
	Patterson Township	2	....
	Union Township	8	....
	Versailles	1	....
	Wayne Township	5	....
	Yorkshire	2	....
Defiance	Defiance Township	4	....
Fayette	Lawrence Township	6	....

CASES AND DEATHS FROM SMALLPOX REPORTED, ETC. — Continued.

County.	Place.	Cases.	Deaths.
Franklin	Clinton Township	11	....
	Columbus	64	....
	Groveport	7	....
	Marion Township	5	....
Fulton	German Township	1	....
Gallia	Raccoon Township	1	....
	Huntington Township	1	....
Hamilton	Cincinnati	30	....
	Lockland	3	....
	Reading	1	....
Hancock	McComb	9	....
	Pleasant Township	12	....
Hardin	Blanchard Township	4	....
Henry	Freedom Township	2	....
	Liberty Township	1	....
	Napoleon	6	....
Huron	Chicago Junction	117	....
	New Haven Township	5	....
	Richmond Township	5	....
Knox	Mt. Vernon	1	....
Lawrence	Ironton	1	....
	Upper Township	1	....
Licking	Madison Township	2	....
Logan	Richland Township	2	....
Lorain	Elyria	1	....
	Lorain	4	....
Lucas	Oregon Township	3	....
	Richfield Township	1	....
	Toledo	74	....
	Washington Township	9	....
Mahoning	Smith Township	2	....
Marion	Claridon Township	1	....
Miami	Laura	12	....
	Lostcreek Township	1	....
	Piqua	16	....
	Spring Creek Township	5	....
	Staunton Township	1	....
	West Milton	1	....
Montgomery	Dayton	15	....
Paulding	Cecil	41	....
	Jackson	2	....
	Paulding	1	....
	Washington Township	17	....
Putnam	Blanchard Township	1	....
	Monroe Township	3	....
Richland	Lexington	10	....
	Madison Township	68	1
	Mansfield	24	....
	Mifflin Township	1	....
	Monroe Township	23	....
	Springfield Township	3	....
	Troy Township	14	....
	Washington Township	5	....
Ross	Twin Township	6	....
Scioto	Portsmouth	22	....
Seneca	Fostoria	12	....
	Tiffin	1	....
Shelby	Clinton Township	5	....
	Cynthiana Township	55	1

CASES AND DEATHS FROM SMALLPOX REPORTED, ETC. — Concluded.

County.	Place.	Cases.	Deaths.
Shelby	Jackson Township	1	....
	McLean Township	6	....
	Loramie Township	2	....
	Orange Township	5	....
	Sidney	19	....
	Washington Township	1	....
Stark	Alliance	4	....
	Canton	3	....
Summit	Akron	3	....
	Boston Township	7	....
	Cuyahoga Falls	1	....
	Hudson Township	1	....
	Stowe Township	9	....
Van Wert	Washington Township	1	....
Wood	Center Township	7	....
	Montgomery Township	1	....
	Portage	6	....
	Prairie Depot	1	....
	Tontogany	2	....
Total	42 Counties, 99 Places	1018	2

QUARANTINE IN SMALLPOX.

There has been considerable discussion of quarantine in smallpox of late years, and even of its entire abolition. This has no doubt been largely due to the exceedingly mild character of the disease for the past ten years. The extremely stringent quarantine of earlier epidemics, when a large number of those afflicted died, had hardly seemed applicable to smallpox as we have been having it. Out of this, modifications in quarantine have come which will doubtless remain.

This Board has for some time been advocating in smallpox what has been called a "Quarantine of observation." This applies only to persons exposed to smallpox and liable to have the disease, and not to the patient.

For instance, if an employe develops smallpox and exposes a number of fellow workmen, these are vaccinated and allowed to continue work; but they are kept under observation for seventeen days from the time of last exposure. This observation consists of a daily examination by a physician, with records of pulse and temperature. Upon the discovery of any symptom suspicious of smallpox in any person under observation, he is at once isolated to await developments.

In case there has been but a single exposure, the observation need not begin before the eighth day thereafter, as the incubation period of smallpox would not be shorter than this. Seventeen days would cover the longest incubation period except in the rarest of cases, which may, in practice, be neglected.

This observation quarantine can be extended to the family of the smallpox patient, or to boarders, if he lives in a boarding house. In this case the smallpox patient must first be removed to some suitable place—to a smallpox hospital if available. Immediately after, the house and contents must be properly disinfected. The inmates, who must be held in the house until this is done, are then to be vaccinated, and may then be allowed their liberty, except for the daily examinations of the physician, as previously noted.

By this "quarantine of observation" ample protection can be given to the public, the first consideration, and the greatest liberty to exposed persons with the least exposure to the community.

The only exception to this plan is for persons who have no employment or fixed abode. Such persons are liable to go to some unknown community where they would not be under observation, with the possibility of their coming down with smallpox.

With this exception the Board favors the abolition of quarantine in smallpox, as the term is usually used, and the substitution of a "quarantine of observation" as here outlined.

DIPHTHERIA.

Mention was made in the last report of the Board's arrangement for distributing antitoxin to boards of health for the treatment of indigent cases, and especially for preventing the disease by immunizing persons housed with some one having diphtheria.

The arrangement has proved quite satisfactory, and a number of outbreaks have been promptly suppressed by the free use of antitoxin in this manner. Many lives were also undoubtedly saved.

The reduced price for antitoxin secured for boards of health has saved the public a very considerable sum. During the year there were distributed to boards of health 826 curative and 812 immunizing doses of antitoxin, at a cost of $2,030.50. At the prevailing prices to individuals this would have cost $5,680.00.

It is to be understood that the Board does not intend to compete with pharmacists or others in the sale of antitoxin. It is furnished only to boards of health, and for the use of indigent persons, and the physician who uses it is required to so certify.

PUBLIC WATER SUPPLIES.

There has been some addition to public water supplies during the year, and also changes or extensions of old supplies.

The following places which heretofore have made use of wells or other private sources of water supply, have changed from a private to a public supply: Garrettsville, Perrysburg and Rocky River.

Plans for public water supplies, or additions to or changes in same,

have been approved by the Board during 1907 as follows: Cadiz, Camp Perry, Ironton, Jefferson, Sandusky, Wilmington and Wooster.

In the following places changes in public water supplies were completed: Medina, Cadiz, Wilmington and Wooster.

Water purifiaction plants were completed in Cincinnati and Lorain.

Investigations relative to improved or new public supplies were made but definite plans have not yet been submitted for Portsmouth and Wellston.

We now have sixty-nine cities (the entire number) and seventy villages making use of public supplies. One city, Cincinnati, and five villages have been added to the list of those supplied with filtered water.

This gives us at the close of the year 1907 a total population of 492,400 using filtered water.

In addition to these new installations, plans for changes or extensions of water-works already in use, were considered for Wilmington and Wooster.

SEWERAGE.

Plans for new systems of sewerage including sewage purification works, or storm water drains and sewerage improvements involving new outlets, were presented by the following places: Cambridge, Chagrin Falls, College Hill (Methodist Home), Dayton, Eaton, Grandview, Kent, Lebanon, Leipsic, Milan, Milford, Nelsonville, Niles, New Philadelphia, Orrville, Piqua, Put-in-Bay, Sebring, St. Mary's, Scio, Steubenville, Sylvania, Toledo, West Milton and Zanesville.

Preliminary investigations relative to sewerage and sewage disposal projects were made for Byesville and New Philadelphia.

The following places completed sewage purification works or made changes or additions to existing plants requiring the approval of the Board: Chardon, London and the Massillon State Hospital.

Plans for sewage purification works, not yet completed, were approved during 1907, for the following places: Akron, Chagrin Falls, Girls' Industrial Home (Delaware), Lakewood, Medina, Milan, Niles, Oberlin, St. Marys and Wadsworth.

A full description of all such improvements in water and sewerage, and the actions of the Board in respect thereto, may be found in a subsequent part of this report.

An exhaustive examination is being made of all water-works in Ohio. This includes a short description of the town and a list of its chief industries; a description of the plant, including the source and character of the supply, with analytical data as to purity; geological formation where ground water is made use of; pumping machinery; storage; water rates, cost and maintenance. Special attention is being given to cost figures, with the view of assistance in finding ways to cheapen the supply.

The various actions of the Board in regard to each supply is also

set forth. This work will be continued until all water-works have been examined, when a complete report upon this subject will be prepared for publication.

INVESTIGATION OF WATER AND SEWAGE PURIFICATION PLANTS.

The special investigation of all water and sewage purification plants in Ohio, begun in 1906, has been continued during 1907. The work is about completed, and is to be made the subject of a special report to the legislature.

It may be said here that very useful and important data have been secured that should result in better construction of future plants, and a greater efficiency for many now in use. Methods have also been found to cheapen the cost of operation in some cases.

LABORATORY.

We would call attention to the increase in work done in the laboratory. This is especially marked in the number of examinations made for physicians to aid them in making a correct diagnosis in doubtful but suspected cases of contagious or infectious disease.

Following is given the number of laboratory examinations made during the year:

Tubercular sputum	1170
Diphtheria swabbings	466
Typhoid fever (Widal test)	128
Water analyses (chemical and bacterial)	1184
Rabies	35
Miscellaneous	94

TUBERCULOSIS.

The State Board of Health took up the question of tuberculosis in 1894, when it sent a communication to every physician in the State requesting certain information. The Board's report for that year contains some striking examples of infection from close human contact. At that time the communicability of the disease from person to person had by no means been accepted by the entire medical profession.

Following this letter to physicians a pamphlet on measures for the prevention of tuberculosis was prepared and sent to physicians, school teachers, the press, and was in other ways widely disseminated.

In 1899 the Board arranged for lectures before various Farmers' Institutes upon the relation of human to bovine tuberculosis and measures to protect the public against danger from tuberculous meat and milk.

In 1901 the Board organized the Ohio Society for the Prevention of Tuberculosis. The Board prepared a bill which, backed by this society, became a law, for the appointment of a commission to investigate and

report upon the feasibility and desirability of establishing a State sanatorium for the treatment of cases of incipient tuberculosis. This commission reported unanimously in favor of such an institution.

In 1904 the Legislature enacted a law, prepared by the Board, and appropriated $35,000 to purchase a site and secure plans for a State sanatorium. A commission was appointed to carry this out, and the secretary of the State Board of Health was made a member of the commission and its secretary.

The Legislature following appropriated $175,000 to commence building.

A favorable and beautiful site of three hundred and fifty-five acres near the city of Mt. Vernon was selected. Contracts were let for the construction of the Administration Block, consisting of office and treatment rooms, general dining room, assembly hall, kitchen and cold storage. The incoming Legislature will be requested to appropriate a sufficient sum to enable the institution to be operated with one hundred beds in the beginning.

The State Sanatorium will be for the cure of incipient cases. If strictly confined to this purpose, as it by all means should be, it will probably never grow to large proportions. There are many reasons why application for admission of incipient cases will be limited. These need not be entered into here.

There will remain a large class afflicted with tuberculosis in a more advanced state sadly in need of public aid. Many such cases could be cured under proper conditions. A still larger number could be so much improved as to enable them to continue work for years after the time they would otherwise have to become a private or public charge. There will remain an even larger number for whom little can be done except to render their dying days as comfortable as is possible by proper care and cleanly surroundings. These are the ones, especially among the very poor, where they are mostly found, who are chiefly responsible for the spread of tuberculosis.

The State should make some provision for the care of the many victims of this disease who cannot be properly cared for at home, and who are unsuitable cases for the State Sanatorium. At present there is no suitable place for them to go, as very few general hospitals will admit cases of pulmonary tuberculosis.

The commissioners of Mahoning County are erecting a special hospital for cases of tuberculosis that would otherwise have to be sent to the county infirmary.

It is impossible to give proper care to these cases in infirmaries, and their presence there greatly endangers the other inmates.

The Mahoning County idea should be carried farther. There should be special hospitals, not only for pauper consumptives, but also for the

poor in need of care who are not yet paupers. A small charge for those able to pay something might be made.

The Board will recommend to the next Legislature that the county commissioners in each county be required to build a tuberculosis hospital upon the infirmary grounds, but separate and distinct from the "poor house" proper. The poor consumptive should be cared for by the public, when unable to care for himself, but should not therefore be made a pauper.

INVESTIGATIONS.

A number of investigations of local unsanitary conditions, of outbreaks of infectious disease, of school houses, of undrained swamp-lands, polluted streams, etc., were made during the year. The conditions found and the proper remedy were made known to the local authorities.

VITAL STATISTICS.

It may be said in a general way that the past year has been a successful one as regards public health work. Sanitary conditions have been improved; much sickness has been prevented, and we have reason to believe that many lives have been saved by the work of health boards.

Unfortunately we are unable to prove this by statistics. We have no means of knowing how many people died in Ohio last year nor, consequently, of what diseases they died.

The Board has repeatedly called attention to this deplorable lack of a system of registration of vital statistics, for which our State is so frequently and justly reproached. Two bills have heretofore been introduced in Legislature by the Board to remedy this condition, but they have failed to become the law. Another bill to this end will be offered to the incoming Legislature, with the hope that Ohio, recognizing the great importance of registering the birth and death of each of her citizens, will no longer neglect what is rightfully considered to be the duty of a civilized people.

MINUTES OF BOARD MEETINGS.

Secretary's Reports.

JANUARY MEETING.

A regular meeting of the State Board of Health was held at the office of the Secretary on January 23rd, 1907, at 8 P. M.

All members were present except Mr. Hartzell, who was in Porto Rico, and Dr. Miller.

The minutes of the last meeting were read and approved.

Mr. William Wilson, city engineer of Niles, presented plans for a sewerage system for that city and asked for their approval.

Dr. Alfred Robinson, member of council, and Mr. D. H. Clark, superintendent of water-works of Ironton, addressed the Board, urging approval of plans for a new water supply for that city.

Mr. J. W. Payne, city engineer, Mr. Myers, representing residents of the Mayfield Allotment, and a member of the board of public service of Akron, appeared before the Board, asking approval of plans for two new sewer districts and a change of outlet for the main sewer.

Dr. A. W. Mardis, health officer of Lebanon, presented plans for a sewer system for that village.

Mr. H. E. Riggs of Toledo, of The Riggs and Sherman Company, and the city engineer of St. Marys, presented plans for sewerage and sewage purification for that city.

A committee, composed of the mayor, W. N. Bradford, the solicitor B. F. Enos and the city engineer, O. M. Hoge, of Cambridge, presented plans for additional sewerage for that city.

At this point, the secretary read a petition that had been filed, signed by one hundred and twenty-eight citizens, objecting to the proposed outlet sewer for Cambridge.

Dr. C. R. Austin of Byesville, addressed the Board in regard to a system of sewerage for that village. No plans had been made but the authorities wished to be informed in advance, if possible, whether the State Board of Health would permit the discharge from their sewers into Wills Creek without purification.

Mr. C. Arthur Brown appeared before the Board in regard to the use of iron and lime as a coagulant in the filtration plant at Lorain.

These various matters were referred to executive session.

In executive session the Secretary read a communication from the board of public service of Lorain, stating that their new filtration plant was soon to be put in operation, and asking the State Board of Health to have a representative present during a test that would be conducted to show the efficiency of the plant.

On motion of Dr. Stanton, this matter was referred to the Secretary with power to act.

The question of approving plans for a sewerage system for Niles was then taken up.

On motion of Dr. Warner, seconded by Dr. Stanton, it was voted to approve a general plan for a sewerage system for the city of Niles, drawn by Mr. Alexander Potter, C. E. in 1893, but only upon the condition that a sewage purification plant, satisfactory to the State Board of Health, be introduced before any more sewers for domestic use are constructed.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Crossland.

In the negative, none.

The Secretary was instructed to suggest that all sewers built in the future should be on the separate plan in order to facilitate the purification of the sewage.

On motion of Dr. Crossland, seconded by Dr. Warner, it was voted to approve completed plans for proposed water supply for the city of Ironton, as shown on drawings submitted January 23, 1907, by Mr. Alexander Potter, consulting engineer, provided:

1st. That the reservoir shown on plans or a reservoir holding at least 1,000,000 gallons be included in the project and constructed before the water from the new source of supply is offered to consumers; and

2nd. That a sufficient number of wells be used so that the combined interior cross-sectional area of all the wells shall equal at least 250 square feet.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Crossland.

In the negative, none.

On motion of Dr. Crossland, seconded by Dr. Chapman, it was voted to approve the plans for a sewer in Cuyahoga Street District, Akron, as shown on drawings submitted by Mr. J. W. Payne, city engineer, December 20th, 1906, provided that the main sewer for this district be constructed at such an elevation that it can, when necessary, be continued in a southerly direction and discharged into the city sewer system, or at sewage purification works.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Crossland.

In the negative, none.

On motion of Dr. Crossland, seconded by Dr. Chapman, it was voted to approve the plans for proposed sewer for Mayfield Allotment and Portage Park Addition, Akron, as shown on drawings submitted by the city engineer, Mr. J. W. Payne, December 20th, 1906, provided that a sewage purification plant, of a design satisfactory to the State Board of Health, be constructed and that all the sewage from the proposed sewer

be purified at such plant before being discharged into the stream or that the sewage be pumped into the city's general sewer system.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Crossland.

In the negative, none.

On motion of Dr. Crossland, seconded by Dr. Chapman, it was voted to disapprove the plans for extending the main sewer of Akron, as shown on drawings submitted by the city engineer, Mr. J. W. Payne, December 20th, 1906; and to advise that instead of building the large combined sewer as proposed, the city take steps toward separating the domestic sewage from the storm sewage in such parts of the city as is necessary; and build a trunk sewer for domestic sewage only, such sewer to discharge into the river at a point suitable for purification works until such time as arrangements can be made for purifying the sewage; surface drainage being allowed, without offense, to discharge into the river where most convenient, thus relieving the domestic sewers.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Crossland.

In the negative, none.

On motion of Dr. Warner, seconded by Dr. Stanton, it was voted to approve the plans for a sewage purification plant for the Stark County Infirmary, as shown on drawings submitted by E. G. Bradbury, consulting engineer, November 22nd, 1906, provided that the operation of the purification plant be at all times satisfactory to the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Crossland.

In the negative, none.

The Secretary presented plans for a sewerage system for the village of Put-in-Bay, submitted by the mayor, J. C. Oldt, January 19th, 1907.

On motion of Dr. Chapman, seconded by Dr. Stanton, these plans were disapproved unless all existing water supply intakes on the northerly side of the island be abandoned and the supply for the corporation be taken from an intake to be located on the southeasterly side of the island at a point to be approved by the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Crossland.

In the negative, none.

The Secretary was instructed to advise the authorities that if the water drawn from this intake is used without filtration, it will be necessary to locate the intake at a much greater distance from shore than would be necessary if the water were filtered before delivering to consumers.

On motion of Dr. Stanton, seconded by Dr. Chapman, it was voted to approve plans for a sewerage system for the village of West Milton, as shown on drawings submitted by Mr. John W. Dowler, consulting

engineer, January 15th, 1907, provided that sewage purification works of a design satisfactory to the State Board of Health be installed and operated when this is deemed necessary by said Board.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Crossland.

In the negative, none.

On motion of Dr. Stanton, seconded by Dr. Warner, it was voted to approve the location of the present temporary outlet of the main sewer in the village of Lebanon, as shown upon plans submitted by Mr. F. M. Cunningham, mayor, and the city solicitor, January 21st. 1907.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Crossland.

In the negative, none.

On motion of Dr. Warner, seconded by Dr. Chapman, it was voted to approve plans for sewerage and sewage purification for St Marys, as shown on drawings submitted January 9th, 1907, by The Riggs and Sherman Company, consulting engineers, provided:

1st. That the sewage purification works be constructed before the proposed sewers are placed in use;

2nd. That detailed drawings of the controlling apparatus be submitted to and approved by the State Board of Health before installation;

3rd. That samples of the filtering material be submitted to the State Board of Health before being placed in the filters and that the proper thickness of each grade of material be determined by the State Board of Health when the quality of the material is examined:

4th. That when the daily flow of sewage shall reach 125,000 gallons the sewage purification works shall be enlarged in a manner and to an extent satisfactory to the State Board of Health; and,

5th. That the method of operation of the purification works be at all times satisfactory to the State Board of Health.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner, Palmer and Crossland.

In the negative, none.

The Secretary was instructed to suggest that the grit chamber at the bottom of the pumping station be omitted.

On motion of Dr. Stanton, plans for additional sewerage for Cambridge were referred to the engineer for investigation.

On motion of Dr. Warner, the proposition of Byesville to discharge raw sewage into Wills Creek was referred to Dr. Crossland and the chief engineer for investigation.

Dr. Chapman presented plans for a relief sewer in District No. 16 in Toledo; and also for sewers for the Bailey Addition in West Toledo.

On motion of Dr. Warner, these plans were referred to Dr. Chapman and the chief engineer for investigation.

The Secretary reported that on account of the appointment of Dr. Elmer G. Horton, chemist and bacteriologist, as health officer of the city of Columbus on January 1st, 1907, he had placed Mr. L. V. Parker in charge of the laboratory, and furthermore, that he had employed Mr. C. B. Young, chemist, to take the place of Mr. H. A. Whittaker, who had resigned to accept a position in the laboratory of the State Board of Health of Minnesota.

The Secretary reported that partly on account of natural increase of work and partly on account of the special investigation of water supplies and sewerage systems, there was very great over-crowding of both the laboratory and engineering departments. He recommended that temporary rooms be secured, outside of the State House, for use of the engineers, and that the rooms made vacant be used for laboratory purposes.

On motion of Dr. Warner, seconded by Dr. Crossland, the Secretary was authorized to have this change made and to secure suitable rooms for the engineering department at a price not to exceed $50 per month.

The committee, consisting of Dr. Stanton and the Secretary, appointed to formulate a plan for the examination of health officers, presented a report.

On motion of Dr. Warner, it was voted to adopt the suggestions in the report and to present it to the Conference of State and Local Boards of Health to be held on the following day.

The Board then adjourned to meet at the Neil House at 12 o'clock on January 24th, 1907.

SECOND SESSION.

January 24th, 1907. Thursday.

The Board reassembled at the Neil House on Thursday, January 24th, at 12:20 p. m.

There were present, Drs. Palmer, Stanton, Chapman and Warner, and the Secretary.

It was voted to call two conferences for representatives of village boards of health of less than 3000 inhabitants together with representatives of township boards of health; dividing the state geographically so as to have one meeting of representatives from the northern half of the state, and another of representatives from the southern half of the state. It was also decided in the motion that one of these meetings should be held in June and the other in October, 1907.

The Secretary presented a communication from the superintendent of schools at Newark, in regard to the injurious effects of the use of natural gas stoves without flues.

No action was taken in the matter.

The Secretary presented a letter from a member of council of the

village of Calais, asking the State Board of Health to appoint a health officer for that village, as it was impossible to get the council to act in the matter.

On motion of Dr. Chapman, seconded by Dr. Stanton, the Secretary was authorized after investigation, to appoint a health officer for the village, subsequently to be approved by the Board.

The Secretary reported that Mr. Hartzell was out of the country and expected to be away until April 1907; that the vice-president, Dr. Palmer, was going to Florida and would also be away until about that time, and that the President had appointed Dr. Frank Warner acting president during the absence of these two officials.

On motion of Dr. Stanton, the Board voted to approve this appointment.

The question of holding more frequent meetings, or meetings of longer duration, was discussed.

On motion of Dr. Warner, seconded by Dr. Chapman, it was moved that hereafter the Board should hold six meetings a year, as nearly as possible at two months intervals, the time to be left to the Secretary.

Matters previously acted upon by mail were then taken up for confirmation as follows:

It was moved by Dr. Stanton, and seconded by Dr. Warner to confirm the Board's action approving the supplementary report of the committee on the water supply of Kelley's Island.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner and Palmer.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Stanton to confirm the Board's action approving plans for a storm water sewer in Church and Mill streets, Chillicothe, to discharge into the Scioto River at the foot of Mill Street, as submitted by Mr. H. M. Redd, city engineer, November 13th, 1906, provided that no domestic sewage of any kind be allowed to enter this sewer, and that this restriction be plainly set forth in the ordinance under which the sewer is to be built.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner, and Palmer.

In the negative, none.

It was moved by Dr. Chapman and seconded by Dr. Warner, to confirm the Board's action approving the proposed method for disposing of the sewage of the Country Club at Pleasant Ridge (said method to consist in discharging the sewage into a vault or tank 7 feet in diameter and 8 feet deep, from which it will overflow into a second tank of somewhat similar dimensions, from the bottom of which it will pass into a system of three lines of porous tile surrounded by gravel, coke and broken stone and parallel to the stream), provided:

1st. That both tanks or vaults be made water-tight.

2nd. That an automatic siphon be placed in the second tank, in order to discharge the sewage intermittently into the system of tile drains;

3rd. That the tile be at least 6 inches in diameter and be laid at least 18 inches below the surface of the ground;

4th. That the lines be at least 15 feet apart;

5th. That if necessary to keep down the ground water level, the territory covered by this tile be thoroughly underdrained; and,

6th. That the joints of the tile be cemented wherever the tile passes over such underdrains.

Those voting in the affirmative were. Messrs Stanton, Chapman, Warner, and Palmer.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Chapman to confirm the Board's action approving plans for sewerage and sewage purification for the village of Oxford, as shown on drawings submitted by Mr. Alexander Potter, consulting engineer, December 14th, 1906, provided the operation of the purification plant be at all times subject to the approval of the State Board of Health, and that the plant be enlarged when deemed necessary by said Board.

These plans to consist of:

(a) A complete sewerage system for the village to be built gradually, as needed; and,

(b) Sewage purification works, located on land near the junction of Bull Creek and Four Mile Creek, comprising for present installation, septic tank, dosing tank and intermittent filters (cross-hatched in red on plans), the filtering material in which is to be submitted to the State Board of Health before being placed.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner, and Palmer.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Chapman to confirm the Board's action approving a proposed scheme for obtaining a public water supply for the city of Ironton from wells sunk in the Ohio River at a point near the Kentucky shore and about one mile up stream from the present pumping station provided:

1st. That complete plans showing detail arrangements of the proposed supply be submitted to the State Board of Health for approval as soon as these plans are made.

2nd. That a filtration plant, of a design satisfactory to the State Board of Health, be installed whenever this is deemed necessary by said Board.

3rd. That the distance between wells shall be figured in accordance with rules laid down in the report of the assistant engineer;

4th. That a sufficient number of wells be used so that the combined

interior cross-sectional area of all the wells shall equal at least 250 square feet; and,

5th. That samples of the water drawn from the wells be submitted for chemical and bacteriological analyses at intervals not greater than three months.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner, and Palmer.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Chapman to confirm the Board's action approving plans for operating machinery and apparatus for the Cincinnati water filtration plant, as shown upon drawings submitted by Mr. George H. Benzenberg, acting chief engineer, on October 23rd, 1906, in accordance with the second condition of approval of the general plans submitted in September, 1905; it being understood that the conditions 1 and 3 of approval of the general plans remain in force and are a part of this approval.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner and Palmer.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Stanton to confirm the Board's action granting an extension of six months time, or until May 8th, 1907, to the village of Plymouth in which to construct an intercepting sewer to convey all domestic sewage to a point below the village and there purify it in a manner satisfactory to the State Board of Health.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner and Palmer.

In the negative, none.

It was moved by Dr. Chapman and seconded by Dr. Stanton to confirm the Board's action appointing Dr. C. N. Clark as health officer of Mt. Eaton, to serve in lieu of a board of health, until the second Monday in January, 1909, at a salary of $35.00 a year.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner and Palmer.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Warner to confirm the actions of the Board approving health officers that had been appointed by council to serve in lieu of a board of health.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner and Palmer.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Stanton to confirm the Board's action approving the rules adopted by the health officer of Fayette, being the same as those recommended by the State Board of

Health, omitting that portion of Section 16 relating to slaughter houses and the storing of fertilizer within the village.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner and Palmer.

In the negative, none.

There being no further business, the Board adjourned.

Attest:

C. O. Probst,
Secretary.

REPORT OF THE SECRETARY.

Mr. President and Members of the Ohio State Board of Health,

GENTLEMEN:—Your Secretary begs leave to offer the following report of the Board's operations since the last meeting, held October 17th, 1906:

But twenty-seven cases of smallpox have been reported, the greatest number, nine, being reported in McComb. Six cases occurred in Ohio Township, Gallia County, four in Toledo, three in Sidney, three in Monroe Township, Putnam County, and one each in Cincinnati and Findlay.

Outbreaks of contagious disease were investigated by one of our medical inspectors in the following places:

McComb, smallpox, by Dr. George Chapman.

Sycamore, scarlet fever, by Dr. George Chapman.

McComb, smallpox, by Dr. Platter.

Piqua, diphtheria, by Dr. Platter.

Sunbury and Scio, scarlet fever, by Dr. Platter.

Dr. Crossland visited White Cottage on account of diphtheria.

Dr. Chapman and the chief engineer visited Kelley's Island relative to a water supply.

Dr. Stanton visited Pleasant Ridge in regard to sewage disposal for the Cincinnati Country Club.

The President appointed the following finance committee for the ensuing year: Dr. Stanton, chairman, Dr. Palmer and Dr. Warner.

Since the last Board meeting, 36 boards of health have ordered antitoxin; and 15 boards have notified us of their having adopted the order. We have distributed 734 curative doses and 645 immunizing doses. This amount of antitoxin represents a cost to the local boards of health of $1,665.75. At the market price this would amount to $4,650.50; a saving of $2,095.25. This represents 2,642,000 units.

The following table shows the results in cases in which antitoxin was used:

CURATIVE DOSES.

Number receiving treatment ....115; deaths, 4

BY AGES.

5 years and under	43
6 to 10 years	37
Over 10 years	35

Minimum one year, maximum 42 years.

Time given after onset of disease:

12 hours and under	50
12 to 24 hours	22
24 to 48 hours	22
48 to 72 hours	14
More than 72 hours	7

Minimum 2 hours; maximum 14 days.

AMOUNT GIVEN.

1,000 units	4	7,000 units	2
1,500 units	1	8,000 units	4
2,000 units	34	9,000 units	1
3,000 units	37	12,000 units	1
4,000 units	14	15,000 units	1
5,000 units	7	16,000 units	1
6,000 units	7	18,000 units	1

IMMUNIZING DOSES.

Number treated	126
Number developed disease	0

Size of dose: 1,000 units, 122; 1,500 units, 1; 2,000 units, 3. Degree of exposure: Same bed, 22; same room, 57; same house, 36; neighbors, 11.

TIME OF EXPOSURE.

8 hours	1	5 days	1
10 hours	6	6 days	1
12 hours	17	7 days	5
18 hours	2	12 days	3
24 hours	14	14 days	7
2 days	21	21 days	1
3 days	13	Continuous	12
4 days	7	Indefinite	15

The chief engineer visited Ada, Canton (Stark County Infirmary), Cleveland, Dayton, Marion, London, Milan, Painesville, Oxford and Sandusky in regard to sewerage; Alliance, Bellaire, Cincinnati, Kelley's Island, Lakeside and Jefferson relative to water supply; and Delta and Lynchburg to investigate nuisances.

The assistant engineer inspected the water supply in the following places: Ada, Celina, Franklin, Fort Recovery, Lima, Madisonville, Miamisburg, Milford, New Philadelphia and Versailles. Copies of his reports were sent to the city officials. He also visited St. Marys in regard to sewerage.

October 17th and 18th the bacteriologist visited Kenton to investigate an outbreak of typhoid fever. The investigation seemed to show clearly that one of the dairies had in some manner become infected and was responsible for a considerable portion of the cases. A copy of his report was furnished to the mayor, as president of the board of health,

and to the owner of the dairy with advice in the way of suggestions to be followed to avoid further trouble.

The attention of the mayor and council and the health authorities of Lima was called to the fact that an investigation of conditions at Ada showed that the public water supply of Lima was in danger at times of pollution from the sewage of Ada. Representatives of the city government of Lima came to Columbus and a conference was held with the Attorney-General, October 23rd. On November 16th, the chief engineer and a representative from the Attorney-General's office went to Ada and met there the Ada officials and representatives from Lima. A thorough inspection of existing conditions regarding the discharge of Ada's sewage into the Ottawa River was made by all present. The officials were told that a more thorough and detailed examination would be made by one of the engineers of the Board before definite advice is given in regard to the proper steps to be taken by the Lima officials.

Colonel Adams, superintendent of the Boys' Industrial School at Lancaster, requested me to come there and determine, if possible, the cause of an epidemic of pneumonia that was prevailing among the inmates. I visited the institution on the 15th instant and met the attending physician, Dr. C. W. Goss of Lancaster. The hospital reports showed that during a period of eight or ten weeks, 52 boys had been sent to the hospital on account of some lung trouble. About 20 of these cases had been diagnosed as pneumonia.

I learned further that quite a number of the inmates, including some of the employes, had been ill with some lung symptoms, lasting for two or three days, but not of sufficient severity to warrant their going to the hospital

An examination of some of the severer cases in the hospital showed pneumonia to be undoubtedly present; but the general character of the outbreak indicated that this was probably a complication of some other disease, probably influenza. A subsequent examination of the sputum in five cases showed the presence of both pneumonia and influenza bacilli. A post mortem examination of one of the cases that died revealed pneumonia.

All but three of the fourteen cottages had contributed hospital cases. While nothing clearly indicated that the disease was being communicated from one person to another, every precaution was being taken at the hospital as regards disinfection, etc., to prevent infection. An examination of the institution showed it to be in excellent sanitary condition. The cottages and other buildings were clean and well kept. Attention was being paid to ventilation and the water supply is above suspicion. The outbreak would seem to be one of influenza, complicated in some cases with pneumonia.

The chief engineer inspected the construction of the water filtration plant at Bellaire and found that it had been built in accordance with the

plans approved, but that lack of pumping machinery makes it impossible to deliver the water to the inhabitants, and the city in consequence will be forced to use its present polluted supply unless necessary machinery is installed. A letter was addressed to the board of public service, calling attention to their typhoid fever death rate and urging that immediate steps be taken to provide pumping machinery which will be suitable for delivering the filtered water to consumers.

In November the health officer of Madisonville asked the Board's assistance in ascertaining whether the encroachment of buildings in the vicinity of the water-works wells was affecting the quality of the water supply. The assistant engineer visited Madisonville and made a report, which showed that the water is safe but subject to some influence from decomposing organic matter, and that steps should be taken to prevent the wells from being affected by pollution from a negro settlement which has recently sprung up in the valley of the creek, a short distance from the water-works wells.

A copy of the report was sent to the health officer and to the board of trustees of public affairs, and they were advised that a sewer system would be the best plan, but if that could not be done at this time, vaults should be properly constructed so as to be water tight and a reliable inspector appointed to look after them to see that they are properly cleaned.

Their attention was called to the great need of sewers for the entire village, and that council should consider the question of installing a sewer system, including sewage purification works.

Upon request of the mayor of Minster the assistant engineer visited that village to investigate the prevalence of typhoid fever. His report showed that the large amount of typhoid fever which generally exists in the village is undoubtedly due to the failure on the part of the health officer to enforce proper sanitary regulations, especially in regard to the construction and care of vaults, and that the most effective and permanent remedy would be the construction of proper systems of water supply and sewerage. As the expense involved prevents this being done at once, rules and regulations were embodied in the report, which, if carried out by the health officer, will afford an effective means of holding the disease in check, until a water supply and sewerage system can be installed.

Copies of the report were furnished the mayor and the health officer, and the latter was advised to at once adopt the rules and regulations governing the construction and cleaning of vaults. The assistance of the Board was offered in the condemning and closing of such shallow wells as are located so near to privies that pollution is unavoidable. They were also advised that the people of the village ought to plan for the introduction of a water supply and sewerage system at the earliest time possible.

In December a petition was received from twenty citizens of Payne, asking the Board to investigate unsanitary conditions existing in the village due to improper drainage. The assistant engineer visited Payne, made a report, which showed that there was great need for the extension of the sewer in Merrin Street and that the property holders were desirous of having this extension. A copy of the report was sent to the health officer and to the council, and the hope expressed that council would grant the extension as the means of abating the nuisance justly complained of.

A petition was received from residents of Delta, complaining of a nuisance caused by the reservoir of the Lake Shore and Michigan Southern Railway Company. The railway authorities were written in regard to the matter and in reply forwarded a statement, signed by eighteen residents of Delta, declaring that the complaint was unfounded. The chief engineer visited Delta and after investigation reported that at the time of inspection no objectionable conditions existed but that it was possible if an investigation were made at time of extreme drought the stagnant water would be found to afford chance for objectionable growths.

A copy of the report was furnished to the health officer and to the railroad company, and the offer made to make another investigation when the above condition existed.

Upon request the assistant engineer investigated a nuisance occasioned by the unsanitary condition of a ditch in St. Clair Street in the village of Milo. His report showed that the only satisfactory remedy for abating the nuisance would be the construction of a sewer in St. Clair Street. A copy of the report was sent to the health authorities of Marion Township, Franklin County, and they were advised that when constructed, no domestic sewage, except sink drainage, should be allowed to enter the sewer until it is connected with the sewer system of Columbus.

Their attention was also called to the uncleanly condition of a dairy in the village and their authority to require the owner to either thoroughly clean and keep the dairy in a cleanly condition, or discontinue its use for that purpose.

Matters previously acted upon by mail should receive a *viva voce* vote.

Respectfully submitted,

C. O. Probst,

Secretary.

APRIL MEETING.

A regular meeting of the State Board of Health was held at the office of the Secretary on Wednesday evening, April 24, 1907, at 8 o'clock.

All members were present except Dr. Miller.

Mr. A. L. Reid, engineer for the village of Eaton, presented a resolution from council asking the Board to consider plans for sewerage and sewage purification for the village, prepared by him and The Riggs and Sherman Company, consulting engineers, and submitted April 10, 20 and 24, 1907.

Mr. William Wilson, city engineer of Niles, asked the Board's approval of a storm sewer for that city.

Mr. C. R. Miller, representing The Rocky River Water Company, addressed the Board in regard to a filtration plant at Rocky River. He stated that changes to improve the filter plant would be made without delay, and requested that no report be made upon examinations of the plant until after these changes could be made.

Mr. J. H. Musser, of Wapakoneta, solicitor for the village of Uniopolis, addressed the Board in regard to the approval of Samuel E. Blank as health officer of that village, to serve in lieu of a board of health.

A delegation consisting of W. B. Hough, A. B. Craig and E. D. Huddle, representing Greenville; and Dr. G. W. Burnett, C. V. Shultz and A. H. Meeker, representing Greenville Township, Darke County and property interests, appeared before the Board in regard to requiring Greenville to install a sewage purification plant without further delay.

Mr. Hough, for the board of public service, asked that the city be given three years longer time in which to install such a plant. This was opposed by others, who stated that a nuisance had already been created by the sewage of Greenville, and that disposal works ought to be introduced at once.

Mr. Frank A. Sebring, of the village of Sebring, appeared before the Board and requested permission to extend a sewer for the village, on condition that a rough screen or crib, for the removal of the solid matter, be installed through which the sewage would pass before entering the creek.

Mr. T. T. Johnson, chairman of a committee of council, of Ironton, addressed the Board and requested, on the part of council that the Board approve the omission of a reservoir as a part of the plans for a new water supply for that city.

Mr. Isaac D. Smead, of Cincinnati, explained a new form of water closet for school buildings.

These various matters were referred to executive session.

The plan for constructing a 33-inch storm sewer in Vienna Avenue, at Niles, from Davis Street to a point on Mosquito Creek immediately below the dam, was taken up.

On motion of Dr. Chapman, seconded by Dr. Palmer, this plan was approved provided:

1st. That the council pass an ordinance forbidding the use of this sewer for anything but storm water and cellar drainage, and that a certified copy of this ordinance be filed with the State Board of Health; and,

2nd. That when the purification plant is built a new sewer be constructed in this avenue for domestic purposes only, and that all house connections, including cellar drains, be then connected to the new domestic sewer; or that the present proposed sewer be reduced in size and, when the purification plant is built, be used as a domestic sewer and other provision be made for storm water.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner, Palmer, Crossland and Hartzell.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Stanton, that the water company of Rocky River be informed that plans for their filtration plant were never submitted to the State Board of Health for approval, as required by law, and that they would be expected, at the June meeting of the Board, to file plans for approval, which should include changes and improvements they have signified their intention of making.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland and Hartzell.

In the negative, none.

It was moved by Dr. Palmer and seconded by Dr. Crossland to approve the plans for sewerage and sewage purification for Eaton, provided:

1st. That the sand filters be enlarged to an area of one and one-half acre for the first installation, and that plans showing this enlargement be submitted to and receive the approval of the State Board of Health;

2nd. That a further increase in the area be made when the average flow of sewage reaches 160,000 gallons per day (which flow is estimated to represent a population of 2,000 people using the sewers), if the State Board of Health at that time deems such enlargement necessary;

3rd. That detailed drawings of the automatic dosing apparatus be

submitted to and receive the approval of the State Board of Health before installation;

4th. That samples of the filtering material, or specifications therefor, be submitted to the State Board of Health before being placed in the filters, and that the specified thickness of each grade of material meet the approval of the State Board of Health, when the quality is passed upon; and,

5th. That the operation of the purification plant be at all times satisfactory to the State Board of Health.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner, Palmer, Crossland and Hartzell.

In the negative, none.

The Secretary was instructed to suggest that the method of sludge disposal be so amended, by locating a shallow sludge bed at the necessary elevation and protecting it from flood waters of the creek, that it will be possible to handle the sludge by gravity and thus save the pumping apparatus.

He was also instructed to suggest that a weir chamber be constructed in the line of the sewer above the plant so that the sewage may be readily gaged when desired; and that the plans for this chamber should be approved by the State Board of Health.

On motion of Dr. Warner, seconded by Dr. Stanton, it was voted not to approve the appointment of Samuel E. Blank as health officer of Uniopolis, to serve in lieu of a board of health.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner, Palmer, Crossland and Hartzell.

In the negative, none.

On motion of Dr. Stanton. seconded by Dr. Chapman, it was voted to instruct the Secretary to notify the council and the board of public service of Greenville that the Board would expect them to make provision for installing a sewage disposal plant without further delay, and to suggest that inasmuch as it has been seven years since plans for the sewage disposal plant were prepared, it might be advisable to have them submitted to some competent sanitary engineer, to determine whether improvements could be made in said plans; and further, that before plans are finally adopted for a disposal plant they should be resubmitted to the State Board of Health, at its meeting to be held in June, 1907, for approval.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner, Palmer, Crossland and Hartzell.

In the negative, none.

The Secretary was instructed to write Mr. Frank A. Sebring, advising that their outlet sewer be permanently extended and that proper purification works, sufficient to care for the present flow of sewage, be installed at Sebring.

On motion of Dr. Palmer, it was voted to reconsider the Board's action in regard to plans for a new water supply for Ironton.

On motion of Dr. Chapman, it was voted to refer the question of a reservoir as a part of the new water works system for Ironton to the chief engineer for investigation and report.

The Board then adjourned to 9 a. m. the following day.

SECOND SESSION.

THURSDAY, 9. A. M. APRIL 25, 1907.

The Board reassembled at 9 a. m., members present as before.

The minutes of the last meeting were read and, on motion of Dr. Chapman, approved.

The Secretary presented his quarterly report, which was approved and ordered filed for publication.

Matters previously acted upon by mail were taken up for confirmation as follows:

On motion of Dr. Stanton, seconded by Dr. Palmer, it was voted to confirm the Board's action approving a proposed sewer for a part of the Bailey Addition to West Toledo's city sewer, located in Caroline Street, as shown on sketch submitted by Mr. Wm. M. Gould, consulting engineer, December 28, 1906, provided Mr. Alfred Bailey sign an agreement whereby there be placed in the deed of any land which may be sold by him in the future, the stipulation that (until provision satisfactory to the State Board of Health has been made for purifying the flow of this sewer), the purchaser shall not use the sewer in Caroline Street for any purpose whatsoever except to drain the ground water which naturally filters into the cellars, the overflow from rainwater cisterns, and uncontaminated surface water. (Such an agreement was received).

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner, Palmer, Crossland and Hartzell.

In the negative, none.

On motion of Dr. Palmer, seconded by Dr. Chapman, it was voted to confirm the Board's action disapproving a relief sewer for District No. 16 in the city of Toledo, as shown on drawings submitted by Mr. F. I. Consaul, city engineer, on December 5, 1906.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner, Palmer, Crossland and Hartzell.

In the negative, none.

The Secretary was instructed to advise the authorities as follows: Instead of a single combined sewer, it would be much more desirable to construct two distinct systems, one for storm water and one for domestic sewage. The storm water could then, without offense, be discharged at the foot of Detroit Street, while it would be necessary to extend the domestic main sewer to a suitable location for sewage puri-

fication works and there purify it. If the domestic sewers are built at the same time as the storm sewers, the increased expense will not be excessive, for the reason that the former can probably be built of sewer pipe from 8 to 18 inches in diameter, and, in general be laid in the same trenches with the storm sewers. Also that as the present main sewer of District No. 16 is overloaded at times of storms, it would probably be permissible to allow the sewage from this present main sewer, when greatly diluted with surface water, to overflow into the above suggested storm sewers.

On motion of Dr. Warner and seconded by Dr. Stanton, it was voted to confirm the Board's action in regard to plans for a proposed new water supply for the city of Wooster, drawn by Messrs. Chapin and Knowles, consulting engineers, and presented February 11, 1907. Said action was as follows:

1st. The disapproval of the use of Spruce Street wells, so-called, which have already been disapproved by the State Board of Health;

2nd. The disapproval of the scheme, proposed by the president of council and other city officials, of obtaining water from more wells to be located immediately west of Spruce Street;

3rd. The disapproval of the scheme, suggested by the president of council and other city officials, of filtering by mechanical filters the water derived from wells;

4th. The disapproval of the scheme, suggested by the president of council and other city officials, for constructing an emergency intake into Apple Creek near Spruce Street, unless a filtration plant, satisfactory to the State Board of Health, is first installed and operated whenever this Apple Creek water is used; and,

5th. The approval of the scheme, proposed by the consulting engineers, of obtaining a water supply from wells in the Killbuck Valley, provided the exact location of these wells be, in the opinion of the State Board of Health, at a safe distance from the city and the water from these wells be satisfactory in quality to said Board.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner, Palmer, Crossland and Hartzell.

In the negative, none.

The Secretary was instructed to advise the authorities as follows: As the water of Apple Creek at the southerly edge of the city is more contaminated than the water of Killbuck Creek, it would be more desirable to arrange for using the water of the latter creek with filtration rather than the water of Apple Creek. The fact that it will be necessary to extend the present main sewer of the city through a pipe laid in the creek bed to a point below the proposed intake at Spruce Street, suggests the possible further contamination of Apple Creek, in case of breakage of or leakage from the pipe, and this further points to the advantage of using Killbuck Creek. The project, therefore, which would ulti-

mately prove most satisfactory for Wooster would be to derive water from wells in the valley of Killbuck Creek, as recommended by the consulting engineers, at a safe distance from the city, and in case such water should at times prove insufficient, to use water from Killbuck Creek with a filtration plant. It would in this case be necessary to operate the filtration plant only when surface water was being used.

On motion of Dr. Chapman, seconded by Dr. Crossland, it was voted to confirm the Board's action approving the plans for sewerage and sewage purification for the village of Scio, as shown on drawings submitted by The Riggs and Sherman Company, consulting engineers, on January 18th and February 23rd, 1907, provided:

1st. That sewage purification works be built before any of the proposed sewers are placed in use, and that all existing sewers be connected with the proposed system;

2nd. That the purification works be enlarged in a manner satisfactory to the State Board of Health whenever such enlargement is deemed necessary by said Board;

3rd. That the management and care of the purification works be at all times satisfactory to the State Board of Health;

4th. That the filters be operated on the contact principle and the sewage be discharged onto the filter at an elevation immediately below the surface. This will make the wooden distributers, shown on plans, unnecessary;

5th. That detailed drawings showing dimensions of dosing tank and controlling apparatus be submitted to and approved by the State Board of Health; and,

6th. That samples of the filtering material be submitted to the State Board of Health before being placed in the filters, and that the proper thickness of each grade of material be determined by the State Board of Health.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner, Palmer, Crossland and Hartzell.

In the negative, none.

The Secretary was instructed to advise the authorities that it would be better for ultimate use to locate the sewage purification works much farther down the valley, away from habitations.

On motion of Dr. Palmer, seconded by Dr. Warner, it was voted to confirm the Board's action disapproving a proposed scheme of the Byesville Development Company for discharging the sewage from Byesville, in an unpurified state, into Wills Creek.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner, Palmer, Crossland and Hartzell.

In the negative, none.

The Secretary was instructed to advise the company to engage the services of an engineer experienced in matters relating to sewerage and

sewage purification, and have him make surveys, plans and estimates, and then submit these to the State Board of Health for criticism and approval.

On motion of Dr. Palmer, seconded by Dr. Stanton, it was voted to confirm the Board's action disapproving a proposed amendment to sewerage plans for the Southwesterly District of Cambridge, previously approved by the State Board of Health, said amendment calling for the locating of the outlet of the main sewer about 2,000 feet above the location already approved by the Board.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner, Palmer, Crossland and Hartzell.

In the negative, none.

On motion of Dr. Stanton, seconded by Dr. Palmer, it was voted to confirm the Board's action approving the plan for a sewage purification plant for the Mayfield Allotment and Portage Park Addition, Akron, as shown on drawing submitted by J. W. Payne, city engineer, March 11, 1907, provided:

1st. That samples of the filtering material be submitted to and receive the approval of the State Board of Health before being placed;

2nd. That detailed plans, showing the arrangement of the dosing apparatus, be submitted to and receive the approval of the State Board of Health before the plant is built;

3rd. That detailed plans, showing longitudinal section through the underdrains, be submitted to the State Board of Health before the plant is built;

4th. That a screen chamber containing a screen with open space of about one-half inch, be placed at the entrance to the dosing tank, and that plans for such screen chamber and screen be submitted to the State Board of Health for approval before the plant is built;

5th. That the plant be placed at least 800 feet from the county infirmary and 400 feet from the highway; and,

6th. That the management and operation of the plant be at all times satisfactory to the State Board of Health, and that the plant be enlarged when, in the opinion of the State Board of Health, this becomes necessary.

Those voting in the affirmative were: Messrs. Stanton, Chapman, Warner, Palmer, Crossland and Hartzell.

In the negative, none.

On motion of Dr. Chapman, seconded by Dr. Warner, it was voted to confirm the Board's action approving the plans for a proposed sewage purification plant for Forest Cliff, Lakewood, as shown on drawings submitted to the State Board of Health, March 15, 1907, by Charles W. Root, city engineer, and in a communication appended to these drawings, provided the operation of the plant be at all times satisfactory to the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Chapman Warner, Palmer, Crossland and Hartzell.

In the negative, none.

The Secretary was instructed to advise, that on account of the small quantity of sewage which will reach the plant for the next few years, only one septic tank be used at first.

On motion of Dr. Warner, seconded by Dr. Crossland, it was voted to confirm the Board's action approving the controlling apparatus for the sewage purification works at St. Marys, as shown on drawings submitted by The Riggs and Sherman Company, March 19, 1907.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland and Hartzell.

In the negative, none.

On motion of Dr. Palmer, seconded by Dr. Stanton, it was voted to confirm the Board's action disapproving the appointment of James Wheeler as health officer of Medina, to serve in lieu of a board of health.

Those voting in the affirmative were Messrs. Stanton, Cahpman, Warner, Palmer, Crossland and Hartzell.

In the negative, none.

On motion of Dr. Chapman, seconded by Dr. Stanton, it was voted to confirm the Board's action approving the rules and regulations adopted by the health officer of Shiloh.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland and Hartzell.

In the negative, none.

On motion of Dr. Stanton, seconded by Dr. Chapman, it was voted to confirm the Board's actions approving certain health officers appointed by council to serve in lieu of a board of health.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland and Hartzell.

In the negative, none.

The Secretary presented plans for a sewage purification plant for the Crawford County Infirmary, as shown on drawings submitted by E. G. Bradbury and George P. Shute, consulting engineers, April 16, 1907.

On motion of Dr. Chapman, seconded by Dr. Warner, it was voted to approve these plans provided the method of operation of the sewage purification plant be at all times satisfactory to the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland and Hartzell.

In the negative, none.

The general scheme for sewage purification for Wadsworth, as shown on a drawing submitted by John W. Holl, consulting engineer, on April 22, 1907, was taken up for consideration.

On motion of Dr. Palmer, seconded by Dr. Chapman, it was voted to approve this scheme provided the total area of the sand filters be

increased to 8,000 square feet; that is, that each filter be 33 square feet instead of 20 square feet; and to approve the installation of one-half of the plant at the present time.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Crossland and Hartzell.

In the negative, none.

The Secretary was instructed to notify the engineer that before final approval is given, full detail plans of the works, in accordance with the standard directions of the State Board of Health, should be submitted to the Board for further consideration.

The plan for a proposed combined sewer in Dock Street, Steubenville, together with laterals in Third, Fourth, Fifth and Sixth streets, as shown on drawings submitted by S. B. Curfman, city engineer, on April 23, 1907, were taken up.

On motion of Dr. Chapman, seconded by Dr. Palmer, it was voted to approve this plan.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Crossland and Hartzell.

In the negative, none.

The plan for a proposed sewer in Caldwell and Camp streets, Piqua, as shown on sketch made by the city engineer and submitted by W. B. Mitchell, clerk of the board of public service, on April 16, 1907, was taken up.

On motion of Dr. Crossland, seconded by Dr. Palmer, this plan was approved provided the council of Piqua, before the sewer is constructed, pass an ordinance forbidding the tapping of this sewer for the purpose of admitting household waste of any kind, and that a certified copy of this ordinance be filed with the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Crossland and Hartzell.

In the negative, none.

The Secretary presented a communication in regard to improvements in the water supply at Lakeside and Put-in-Bay.

No action was taken.

The plans for sewerage and sewage purification for the village of Milan, as submitted by E. G. Bradbury and George P. Shute, consulting engineers, April 16, 1907, were taken up.

On motion of Dr. Palmer, seconded by Dr. Chapman, it was voted to approve these plans provided:

1st. That the sewage purification plant be enlarged in a manner satisfactory to the State Board of Health whenever such enlargement is necessary in the opinion of said Board;

2nd. That the operation of the plant be at all times subject to the approval of the State Board of Health;

3rd. That the main outlet for the effluent be continued to the Huron

River instead of being discharged into the small creek bordering the site for the sewage purification works;

4th. That samples showing the size and quality of the filtering material to be used, be submitted to and receive the approval of the State Board of Health before it is placed in the filters; and,

5th. That detailed drawings of the controlling apparatus be submitted to and approved by the State Board of Health before installation.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Crossland and Hartzell.

In the negative, none.

The plan and specifications showing the quality, size and depth of various grades of filtering material for St. Marys sewage purification plant, as submitted by The Riggs and Sherman Company on April 24, 1907, were on motion of Dr. Crossland, seconded by Dr. Chapman, approved.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Crossland and Hartzell.

In the negative, none.

The method of sewage purification for Oberlin, as indicated by a sketch submitted by W. B. Gerrish, city engineer, on April 9, 1907, was taken up.

On motion of Dr. Stanton, seconded by Dr. Palmer, this method of sewage purification for Oberlin was disapproved.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Crossland and Hartzell.

In the negative, none.

The Secretary was instructed to suggest to the engineer that he prepare, for the consideration of the State Board of Health, plans on the intermittent sand filtration basis, providing as much area as it is possible to pay for with the present financial condition of the village, and using fine broken stone, or similar material, for the lower portion of the filters, if by this means a saving could be effected.

On motion of Dr. Crossland, the water supply and sewerage for Camp Perry, Erie Township, Ottawa County, was referred to the Secretary for conference with the engineer in regard to some changes in the plans.

On motion of Dr. Palmer, seconded by Dr. Chapman, a new sewerage blank, presented by the Secretary, was adopted.

The rules and regulations adopted by the health officer of Granville, Dr. C. B. Evans, were taken up for consideration.

On motion of Dr. Chapman, seconded by Dr. Palmer, the rules and regulations were approved with the exception of Section 15, which, as proposed by the health officer, was disapproved.

Those voting in the affirmative were Messrs. Stanton, Chapman, Palmer, Crossland and Hartzell.

In the negative, none.

On motion of Dr. Stanton, it was voted to hold the next meeting in Cleveland, on Wednesday, June 12, 1907, and on the following day to hold a joint meeting with representatives of villages of less than 3,000 inhabitants and township boards of health in the northern half of the state.

On motion of Dr. Stanton, the program and arrangements for the meeting were left to the president and secretary.

There being no further business, the Board adourned.

Attest: C. O. PROBST,
Secretary.

REPORT OF THE SECRETARY.

April Meeting.

Mr. President and Members of the Ohio State Board of Health,

Gentlemen: — Your Secretary begs leave to offer the following report of the Board's operations since the last meeting, held January 23rd, 1907.

There has been an increase in the number of cases of smallpox, 121 cases having been reported since January 19th, in sixteen counties, as follows: Butler 9, Clark 1, Cuyahoga 5, Franklin 20, Gallia 2, Hamilton 10, Hancock 8, Knox 1, Lawrence 8, Licking 2, Lorain 1, Scioto 21, Shelby 16, Summit 1, Stark 3, and Wood 13.

Visits were made by Medical Inspectors as follows:

Dr. Lyle visited Oxford, where he found chickenpox

Dr. Platter visited Waynesburg, where he pronounced the disease chickenpox.

Dr. George Chapman visited Mansfield, Prairie Depot and Portage on account of smallpox, and Castalia to investigate an epidemic of cerebro spinal meningitis.

I was also called to Castalia, March 25th, to investigate this epidemic, and found that the first case occurred at Vickery, some eight miles from Castalia. A second case also appeared there, but this patient had been working in Castalia. There have been 18 cases with 13 deaths, two have recovered and four are still under treatment. The clinical history of the cases and our finding of *Diplococcus intracellularis* in the spinal fluid and brain tissue from one of the patients who died, warrant the diagnosis of epidemic cerebro-spinal meningitis.

Several theories were advanced as to the cause of this outbreak. It was suspected by some that the large pond in the village, which is supplied with springs and contains a luxuriant growth of water plants, was responsible. It appears that during the summer months there is considerable odor from this pond, occasioned by the decomposition of snails, in which it abounds, and to some extent by decaying vegetation.

Although this pond has existed for a long period of years, it was not unnatural that it should be looked upon with suspicion on account of the odors spoken of. It was also claimed that the pond receives sewage and other pollution. An inspection, however, showed that no sewage enters the pond, and that the only source of pollution is the surface wash which carries to it in times of rain storms some barnyard washings.

Several samples of water from the pond were taken at different places and examined in the laboratory. The examination showed that the pond is receiving practically no pollution from animal sources and that the spring supplying it is pure and suitable for domestic purposes. I think it may be safely stated that this pond has no causal relation to the outbreak.

It was suggested that possibly the construction of an electric railway through the village and a pond of stagnant water occasioned thereby, might be the cause of the epidemic. There are no grounds, in my judgment, for such an opinion. Neither is the theory tenable, advanced by some, that the water-cress grown in water near the large pond, and eaten by several of the patients, had anything to do with it. There is nothing to show that the unsanitary condition of houses in which cases occurred was in any way responsible for the disease. On the contrary, the sanitary condition in most cases was good.

The disease was apparently not communicated by personal contact. In only two instances were there two cases in the same family. This corresponds with what has been noted in all investigations of epidemics of this character. Neither sanitary conditions nor contact explain its development or spread.

A fact which still further shows that local conditions, peculiar to Castalia, are probably not to be accused of being the cause of their epidemic in the occurrence of cases of cerebro-spinal meningitis in other parts of the state, thirty deaths from this disease having been reported elsewhere. Of these sixteen were in Clevland, six in Toledo, and one each in Cincinnati, Cambridge, Delaware, Ironton, Marion, Sebring and Wellston.

The Secretary visited the Mansfield Reformatory where he found a case of chickenpox.

Dr. Crossland and the engineer, as a committee, visited Byesville in regard to proposed sewage disposal; and Cambridge to investigate proposed amended sewer plans.

Dr. Chapman and the engineer, as a committee, investigated the storm water sewer in the Bailey Addition in Toledo.

The engineer visited Eaton in regard to sewerage; Jefferson relative to a proposed water supply; Sebring in regard to the extension of a sewer; Steubenville and Zanesville relative to sewerage. He also visited the Lynchburg distillery, where he found conditions improved; and the Girls' Industrial Home at Delaware in regard to sewage purification.

One of the special assistant engineers visited Dennison relative to sewerage.

The assistant engineer visited the following places to investigate the public water supply: Ada, Beach City, Canal Dover, Cadiz, Canton, Franklin, Findlay, Kenton, Lorain, Leipsic, Lafayette, Massillon, Mingo Junction, Milford, Newcomerstown, Ottawa, Paulding, Strasburg, Scio

and Toronto. He also visited Findlay, New Philadelphia and Paulding in regard to sewerage; and Conneaut, with one of the special engineers, to investigate an outbreak of typhoid fever. A copy of his report on the water supply of Franklin, Kenton, Milford and Ottawa was furnished to the health officer and superintendent of water works. In each case the report showed that the water works had been installed in accordance with the approval of this Board, and the water was of good quality.

The special assistant engineers have made investigations at the following places:

Water filtration plants: Bucyrus, Conneaut, Dennison and Uhrichsville, Elyria, Fostoria, Geneva, Lorain, Marietta, Newark, Oberlin, Rocky River, Upper Sandusky, Vermilion and Youngstown.

Sewage purification plants: Canton, Collinwood, Clyde, Dayton, East Cleveland, Glenville, Gallipolis, Kenton, Lakewood, Lancaster, Mansfield, Marion, North Amherst, Oberlin, Plain City, Sandusky, Toledo and Xenia.

The superintendent of water works at Bucyrus was notified that the examination of the new filter plant showed that the apparatus for introducing the coagulant was not satisfactory and the clear water basin had not been protected from outside pollution; and he was advised of changes that should be made.

At Conneaut the filtered water was found to be satisfactory, but the plant was working up to its full capacity and the authorities were advised that it would probably be necessary to install a new filter within a short time. They were also advised to employ a more competent man to operate the filters.

The examination of the plant at Fostoria showed a considerable pollution in the water between the filters and the pumps; that there was constant danger of excessive rates of filtration, due to the absence of any method of controlling the rate, and that the small capacity of the clear well, emptied at the end of a day's run, caused a tendency to operate the filters too fast at that time; and that the absence of loss of head gages and rate controllers made it impossible to properly regulate the filters. A letter was addressed to the board of public service setting forth recommendations for improving the plant.

The examination of the filter plant at Marietta showed some local contamination in the vicinity of the intake. The superintendent was advised to use a greater amount of coagulant pending an investigation to locate this, if possible.

The new filter plant at Lorain was found to have been built essentially in accordance with the plans approved by our Board; but the authorities were notified that they should make the wall between the coagulating basin and the clear well, and the wall between the coagulating basins, water-tight. They replied that these changes would be promptly made.

At Rocky River the filters were not giving the results guaranteed by the filter company, bacillus coli being found in four of five samples of filtered water. Extracts from the engineer's report were furnished the authorities, recommending certain changes to be made to improve the working of the plant.

The plans for this plant were never submitted to this Board for approval, and the intake is located dangerously near the Lakewood sewage plant. It is expected that representatives of the company will appear before the Board at this meeting.

The examination at Vermilion showed the filter plant to be in a very satisfactory condition. The authorities were, however, advised to make a change in their methods of application of the coagulants.

At Upper Sandusky the examination of the water purification plant showed that the character of the filtered water was such as to make it a serious menace to the health of the consumers; the colon bacillus was present in nearly every sample from the river, the clear well, the effluent from the filters and samples from the distributing mains. The authorities were advised to have the alum feeding device overhauled and a larger piping system substituted for the one in use, and to place a cloth screen in the ball cock tank to prevent the outlet from clogging. We were notified that this advice had been followed.

At Ashland it was found that extensive alterations had been made in the sewage purification plant and that it was in good condition.

The examination of the sewage plant of the Lake Shore and Michigan Southern Railway Company at Collinwood showed the plant to be inadequate to purify the sewage, owing to the rapid growth of the shops, and the company was advised to either enlarge the plant or to make connection with the sewerage system of Collinwood.

The examination of the plant at Clyde indicated that the sewage of that city was being purified in a satisfactory manner.

The plant at Geneva was found to be caring for the sewage in a satisfactory manner, though one filter was receiving a very small amount of sewage and the authorities were advised to appoint a competent caretaker, who would devote his entire time to the operation and maintenance of the plant.

After an examination of the plant at Oberlin the authorities were advised to remove the sand from the filters and reconstruct the underdrains by placing a screened and graded gravel layer over the strainer system, and, upon the gravel, new sand of suitable size and quality.

The inspection of the sewage plant at the Soldiers' and Sailors' Home at Sandusky indicated that the plant was well cared for and apparently purifying the sewage in a satisfactory manner. The authorities were advised to remove the aerator, which was causing bad odors.

The plant at the Toledo State Hospital was found to be in good

condition. Certain recommendations were made to the authorities for preparing the filters for winter use.

The city solicitor of Kenton, on March 12th, requested an investigation of the Kenton sewage plant and also advice as to the desirability of discharging the effluent from the plant into a proposed land drain. One of the special assistant engineers visited Kenton on March 13th, made an investigation and report. The report, together with past investigations of the State Board of Health, showed that under present conditions the plant cannot be depended upon to produce a non-putrescible effluent, but if all surface water were excluded from the sewers (which the city officials are endeavoring to do) and the filtering material were removed from the filters and thoroughly washed, the plant would probably be more efficient. A copy of the report was furnished the authorities and they were advised that if with these changes it was found that the plant did not at all times produce a non-putrescible effluent, the construction of the plant could be modified at an expense of not over $1,500, in such a way as to insure a satisfactory effluent at all times.

The co-operative work between the Board and the United States Department of Agriculture has been continued. Since the last meeting two government bacteriologists have spent four weeks at Lancaster and six week's at Marion, making continued investigations of the practicability of sterilizing the effluent from sewage purification works by means of copper sulphate and also by means of chlorine evolved from bleaching powder. While the results have not been completely written up and tabulated, the indications are that bleaching powder will serve as a very useful and economical medium for rendering sewage effluent free from harmful bacteria. The indications are that this method will be of great use in cases where sewage purification works drain into a public water supply, especially at times of epidemic. This co-operative work is making a valuable addition to our special investigation of water and sewage plants.

The Government has kindly permitted one of its bacteriologists to assist one of our special assistant engineers at Youngstown, for a period of two weeks, in making a number of analyses at the filter plant in reference to determining B. coli in the filtered water.

Complaint was made to the Board by a resident of North Broadway, a suburb of Columbus, through her attorney, that her land was being damaged and a nuisance created by the discharge of unpurified domestic sewage into a small run passing through said land. The assistant engineer investigated the complaint and made a report which showed that the plans for the storm sewer in this addition to Columbus had never been approved by the State Board of Health. The report also revealed that the well on the premises of the complainant was polluted by reason of this sewer.

Copies of the report were sent to the township health authorities,

the complainant's attorney, and to the health officer of Columbus, as it was found that a dairy on the premises was furnishing milk to that city.

Matters previously acted upon by mail should now receive a *viva voce* vote.

Respectfully submitted,

C. O. PROBST,

Secretary.

JUNE MEETING.

A regular meeting of the State Board of Health was held at the Hollenden Hotel, Cleveland, on June 12, 1907, at 8 P. M.

All members were present except Mr. Hartzell and Dr. Crossland. Dr. Palmer presided.

Mr. H. E. Riggs of The Riggs and Sherman Company presented plans for a storm water sewer for the village of Leipsic, to be laid in a county ditch.

Mr. Charles A. Hammond, as village solicitor, appeared before the Board in regard to the building of the sewage disposal plant for Oberlin. He stated that it would be impossible, from lack of funds, to comply with the demands of the Board to construct a sewage disposal plant as suggested by the Board.

The Board then went into executive session.

On motion of Dr. Warner, seconded by Dr. Chapman, the Oberlin matter was referred to a committee consisting of Dr. Miller and the chief engineer, R. W. Pratt, to visit Oberlin and report upon conditions.

It was moved by Dr. Stanton and seconded by Dr. Chapman to approve the plans for a storm sewer for the village of Leipsic, as prepared by the consulting engineers, The Riggs and Sherman Company, provided the council of Leipsic pass and enforce an ordinance prohibiting any house connections with said sewer except for cellar drainage, and that a copy of such ordinance be filed with the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Miller.

In the negative, none.

The Secretary presented a report by Dr. Chapman and the chief engineer upon sewerage and sewage disposal for what is known as the "White City," an amusement place near the city of Toledo.

On motion of Dr. Warner and seconded by Dr. Stanton it was voted to disapprove the proposed method of disposing of the sewage of the "White City" by discharging it unpurified into Ten Mile Creek.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Miller.

In the negative, none.

The Secretary was instructed to advise the authorities that they should install a plant for purifying the sewage of the "White City" before discharging it into the creek, plans for which should be submitted to and approved by the State Board of Health before being carried out, as required by law.

Mr. C. R. Miller and representatives from Rocky River, appeared before the Board in regard to the water filtration plant for that village. They stated that owing to weather conditions they had been unable to make necessary lake soundings until recently, but that desired changes in the filtration plant would be made soon. They asked for further time in which to present plans showing such changes.

On motion of Dr. Chapman it was voted to grant an extension of time.

The minutes of the last meeting were read and approved.

The Secretary presented his Quarterly Report, which, on motion of Dr. Warner, was approved and ordered filed.

A resolution passed by the council of Eaton was presented, asking the Board to modify the conditions of its approval of the plans for a sewage disposal plant for that village.

On motion of Dr. Warner, this matter was referred to a committee consisting of Dr. Chapman and the chief engineer, for investigation and report.

The Secretary presented a communication from the board of health of Loudonville, stating that they had been requested by the board of education to permit the use of a basement room in a school building for school purposes. The board of health of Loudonville, after investigation, had approved the use of this basement room, it having been found suitable, provided the State Board of Health should approve same.

After some discussion it was voted to instruct the Secretary to inform the board of health of Loudonville that this was not a question requiring any action on the part of the State Board of Health, but should be settled by them.

The secretary presented a communication from the health officer of Port Clinton, together with newspaper clippings, relative to the disposal of the garbage of the city of Toledo by dumping it into the lake. No action was taken, but Dr. Chapman, the member of the board from Toledo, stated that there was absolutely no probability that such a plan would ever be followed by the city of Toledo.

A communication was presented from E. G. Bradbury, C. E., of Columbus, asking to withdraw plans presented by him at a former meeting for a sewage purification plant for the infirmary of Stark County. Mr. Bradbury explained that a later arrangement had been made whereby the sewage from the infirmary would be admitted to the sewerage system of the city of Canton.

On motion of Dr. Chapman it was voted to grant Mr. Bradbury's request.

The Secretary presented a number of communications in regard to the Board's approval of Dr. J. E. Bayliff as health officer for Uniopolis, such appointment having been certified to the Board for approval by the council of that village.

Dr. Warner moved that this matter be referred to some member of the Board for investigation.

On motion of Dr. Miller the Board voted to appoint Dr. Warner a committee of one to investigate and report upon conditions at Uniopolis.

The following rules and regulations for the disposition of garbage in the village of Ashland, adopted by the health officer, Mr. E. A. Kauffman, acting in lieu of a board of health, were presented to the Board for approval:

1. All garbage shall be collected and disposed of by a garbage collector employed by the village council.

2. The collector shall furnish a water-tight conveyance for hauling garbage, which conveyance shall be so constructed that no garbage will be dropped on the streets or sidewalks in the village of Ashland.

3. The village shall be divided into two districts as follows: All the territory south of Main Street and Cleveland Avenue shall be the south district, and all the territory north of Main Street and Cleveland Avenue shall be the north district.

4. The collector must so arrange his routes as to cover each entire district every two days during the term of his contract.

5. When a load of garbage is collected it shall be taken to the sewage disposal plant or other place designated by the council.

6. Said garbage shall be placed in trenches or other depressions and covered at least one foot deep with earth, under instructions of the health officer or other person in charge of the grounds.

RULES GOVERNING HOUSEHOLDERS.

1. The owner or tenant of each dwelling or business room in the village of Ashland where garbage collects shall provide a metallic can, with a metallic cover, which shall be placed so as to be convenient for the collector. Said can shall be kept tightly covered so as to prevent dogs, cats or rats from scattering the contents and to prevent foul smells arising therefrom.

2. No dishwater or other water shall be thrown into the garbage can to be hauled away, as in warm weather it causes the garbage to ferment and smell more quickly. All dishwater and other liquids likely to become offensive should go into the sanitary sewer.

3. All decayed vegetables and meats or other substances which may emit an offensive odor, and all waste or offal that comes from a kitchen or grocery store or meat market, will be considered as garbage and must be deposited in garbage cans and disposed of by the garbage collector.

4. No ashes or boots, shoes, old clothes, tin cans, queensware, glassware or any metallic earthenware or banana stalks will be allowed to be put into said garbage cans. When the collector finds such rubbish in the can, he may refuse to take it and so notify the owner and still refuse to take it until such rubbish is removed and when he has made his second trip and still finds such rubbish therein, the collector may notify the proper officer of such nuisance, who may cause the arrest of such person for allowing such nuisance to exist.

5. All rubbish must go to a place designated for rubbish and no garbage will be allowed to be dumped on any rubbish pile or ground designated as rubbish dump under a penalty.

6. No butcher's offal, garbage, dead animals or putrid or stinking animal or vegetable matter shall be allowed to collect on the premises of any person, or to be thrown or allowed to run into any street, alley, lane or place or into any

standing water or excavation within the village of Ashland, Ohio, as provided by Section 6921 of the Revised Statutes of Ohio.

On motion of Dr. Miller, seconded by Dr. Warner, it was voted to approve these rules and regulations.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Miller.

In the negative, none.

The Secretary recommended that the Board take up a special investigation of the collection and disposal of garbage in all cities of Ohio and make a special report thereon a year or two hence. He presented a memorandum which had been prepared by the assistant engineer, Paul Hansen, in regard to such work.

On motion of Dr. Chapman, the Board voted to refer the matter to the Secretary, with authority to carry out such an investigation and prepare a report thereon.

Plans prepared by Messrs. Chapin and Knowles, consulting engineers, for proposed new water supply and filtration plant for the village of Jefferson were presented by the Secretary, and also a report by the chief engineer in regard thereto.

It was moved by Dr. Chapman and seconded by Dr. Miller, to approve these plans submitted by the consulting engineers May 31st, 1907, provided:

1st. That the management and operation of the plant, the use of the coagulant, and the rate of filtration be at all times satisfactory to the State Board of Health.

2nd. That detailed plans showing method of controlling rate of filtration be submitted to and receive the approval of the State Board of Health before the plant is built; and,

3rd. That detailed plans of the sedimentation basin and of the coagulant apparatus be submitted to and receive the approval of the State Board of Health before the plant is built.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Miller.

In the negative, none.

The Secretary presented a plan for storm water sewerage for the village of Sylvania, prepared by L. T. Owen of Toledo and submitted by W. B. Harris, clerk of the council of Sylvania, on May 16th, 1907; and also a report by the chief engineer.

It was moved by Dr. Miller and seconded by Dr. Chapman, to approve this plan; provided, that the village council first pass and file with the State Board of Health an ordinance forbidding the tapping of all sewers shown on this plan, or any future sewers tributary thereto, for the purpose of admitting water closet wastes, sink drainage, or household wastes of any kind.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Miller.

In the negative, none.

Matters previously acted upon by mail were then taken up for confirmation as follows:

It was moved by Dr. Miller and seconded by Dr. Chapman to confirm the Board's action approving plans for a water supply and sewerage system for Camp Perry, situated on the shore of Lake Erie four miles west of Port Clinton, shown on blue prints submitted by Colonel E. T. Miller, Assistant Quartermaster General of Ohio, April 24th, 1907, provided:

1st. That it be understood that the maximum capacity of the water filters, for short periods, is not greater than 300,000 gallons per day; and that the permanent capacity of the sewage filters for short periods is not greater than 125,000 gallons or the sewage produced by 2,500 people.

2nd. That the operation of the water and sewage plants be constantly under the supervision of trained men; that care be taken to secure the greatest efficiency at all times; and that the methods of operation be at all times satisfactory to the State Board of Health.

3rd. That the complete area of the water filters and of the sewage filters, as shown on plans, be constructed before the beginning of the 1908 season.

4th. That the water and sewage filters be further enlarged when found necessary by the State Board of Health; and,

5th. That the contents of the ditch which receives the sewage effluent be treated with chemicals, for purposes of sterilization, in a manner to be prescribed by the State Board of Health, before pumping into the lake.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Miller.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Warner to confirm the Board's action approving the proposed additional water supply of Cadiz, to be derived from a well, 137 feet deep, located in the valley north of the village and nearly one-half mile from the main supply which was approved in 1895.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Miller.

In the negative, none.

The Secretary was instructed to advise the authorities that before any new wells are drilled, the question of approving the location of such wells should be submitted to the State Board of Health and to call attention to the importance of having the water for the present supply

analyzed at regular intervals in order to detect any deterioration in quality.

It was moved by Dr. Warner and seconded by Dr. Miller to reaffirm the action of the Board requiring the construction of a reservoir as a part of the new water works system for Ironton.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Miller.

In the negative, none.

It was moved by Dr. Chapman and seconded by Dr. Miller to confirm the Board's actions approving health officers, appointed by their respective councils, to serve in lieu of a board of health.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Miller

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Chapman to confirm the Board's actions approving rules adopted by the health officers of the following places, serving in lieu of a board of health:

Clifton, the rules recommended by the State Board of Health, omitting that portion of Section 16 relating to hogs;

Shawnee, the rules as recommended, adding to Section 10 the following: "Or deposit any waste paper, empty tin cans or any other refuse matter upon any public street, alley or other public grounds in said village." Also omitting that portion of Section 16 relating to the keeping of hogs within the village.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer and Miller.

In the negative, none.

The election of officers for the ensuing year was taken up.

Dr. Stanton nominated Dr. Palmer as president, to take his seat at the October meeting. The motion was seconded by Dr. Warner.

The Secretary was instructed to cast the ballot of the Board for Dr. Palmer as president. The Secretary announced that he had cast the ballot, as directed, and Dr. Palmer was declared elected president.

Dr. Warner nominated Dr. Stanton for vice president and moved that the Secretary be directed to cast the ballot for Dr. Stanton. The motion was seconded by Dr. Miller and carried. The Secretary announced that he had cast the ballot of the Board as directed and Dr. Stanton was declared elected vice president.

On motion of Dr. Warner it was voted to hold the regular October meeting of the Board in Cincinnati, and to provide for a conference with the township and village boards of health in the southern half of the state in connection with such meeting; the program to be left to the president and secretary.

On motion of Dr. Miller, it was voted to hold a meeting in August

at Put-in-Bay, the time of meeting being left with the president and secretary.

There being no further business the Board adourned.

Attest: C. O. PROBST,
Secretary.

REPORT OF THE SECRETARY.

June Meeting.

Mr. President and Members of the Ohio State Board of Health:

Gentlemen — Your Secretary begs leave to offer the following report:

SMALLPOX.

There has been a considerable increase in smallpox cases since our last meeting, April 24th, 335 cases and one death having been reported in twenty counties, as follows:

Ashland 1, Ashtabula 3, Crawford 2, Darke 8, Franklin 31, Hamilton 10, Hancock 5, Henry 6, Huron 66 (estimated number at Chicago Junction 60), Lucas 49, Mahoning 2, Miami 22, Montgomery 1, Richland 27, Ross 6, Stark 7, Seneca 9, Scioto 1, Shelby 72 and Summit 7.

Extensive outbreaks have occurred at Chicago Junction and vicinity, in the southwestern part of Shelby County, and in Troy and Washington townships, Richland County, including the village of Lexington. Twenty-four cases were reported in Columbus and 38 in Toledo.

The disease is still present in Conneaut Township, Ashtabula County; Polk Township, Crawford County; Versailles, Yorkshire and Wayne Townships, Darke County; Columbus, Groveport, and Clinton Township, Franklin County; Cincinnati, Hamilton County; Napoleon and Freedom Townships, Henry County; Chicago Junction and New Haven Township, Huron County; Toledo, Richfield and Washington Townships, Lucas County; Smith Township, Mahoning County; Piqua, Lostcreek, Springcreek and Staunton Townships, Miami County; Dayton, Montgomery County; Mansfield, Lexington, Troy and Washington Townships, Richland County; Twin Township, Ross County; Fostoria and Tiffin, Seneca County; Sidney and Cynthian Township, Shelby County; Alliance, Stark County; and Boston Township, Summit County.

Outbreaks of the disease were investigated by Medical Inspectors in the following places:

Toledo, Tiffin, Washington Township, Lucas County and Chicago Junction, by Dr. George Chapman.

Staunton Township, Miami County; Yorkshire and Versailles, Darke County, and Washington Township, Shelby County, by Dr. Kitzmiller.

Chicago Junction was twice visited by Dr. Platter, once at the expense of our Board and once at the expense of the local authorities.

We have newspaper reports of outbreaks at Hamilton, Butler County, and Dillonville, Jefferson County, but the local authorities have not, so far, replied to my letters of inquiry.

ANTITOXIN.

Since the Board originated the plan of keeping antitoxin for the use of local boards of health last August, we have distributed 1965 packages. Of these 605 have been returned. Of the antitoxin used, 663 were immunizing doses, 697 were curative.

The amount used has cost the boards of health $1,631. At the regular market rate for antitoxin this would amount to $4,851.50; which would be a saving to the local boards of health of $3,220.50.

The amount used represents 2,582 thousand units.

The President and Secretary attended the Conference of State and Provincial Boards of Health of North America in Washington, D. C., May 30th and 31st.

The Secretary also attended the meeting of the National Association for the Study and Prevention of Tuberculosis in Washington May 6th; and the Conference of the Surgeon General of the Public Health and Marine Hospital Service with representatives of State Boards of Health, held in the same city, May 29th.

Upon request of the local authorities, the President, Mr. Hartzell, investigated the sanitary condition of East Liverpool and made a report, a copy of which was furnished to the mayor and health officer.

The chief engineer made the following visits: Camp Perry, in Erie Township, Ottawa County, to investigate proposed water supply and sewerage; Ironton in regard to water supply; Marietta to inspect the water purification plant, and Orrville and Sylvania in regard to sewerage.

In March a letter was received from the health officer of Conneaut, stating that an unusual prevalence of typhoid fever existed there and requesting the Board to make an investigation. Accordingly the special assistant engineer in charge of the investigation of water filtration plants, and the assistant engineer, went to Conneaut April 1st, the former making an investigation of the operation of the filter plant for a period of five days, and the latter made a study of typhoid conditions existing throughout the city.

The report of the engineers showed that the public water supply was the source of the infection in nearly all cases; that, owing to several faulty features in the construction of the filters it is at times impossible to afford complete protection to consumers even with most careful attention on the part of the filter attendants. As a reasonable safeguard against future epidemics of typhoid and to promote economy in water works maintenance, certain alterations in and additions to the water works plant were recommended. The report also stated that conditions

would be greatly improved by purifying the sewage of the city before discharging the same into Conneaut Creek, although this would not render unnecessary the reconstruction and proper operation of the filter plant.

A copy of the report was furnished the health officer of Conneaut and to the Conneaut Water Company.

I understand that the water company will at once arrange for the introduction of two new filters, and will also make other changes to put the plant in good condition.

The assistant engineer made investigations of the water supply at Cadiz, Dayton, Lorain, Miamisburg, Nelsonville, Springfield and Wellston; typhoid fever at Conneaut; stream pollution at Dayton, and of a school house at West Mansfield.

Copies of his report on the public water supply of Cadiz, Miamisburg, Mingo Junction, Toronto and Wellston were sent to the authorities. The supply of Cadiz was found to be of good quality. The examination of the supply at Miamisburg showed that the evidences of past pollution of the water indicated by analysis in 1905 still exist, though the water at present is not dangerous. The authorities were advised that the supply should be analyzed frequently and watched closely and if marked deterioration is found the village should seek a new supply.

The supply at Mingo Junction was found to be unsafe from a sanitary standpoint, and on account of the clearness of the water which leads the public to believe in its purity, it is all the more dangerous. They were advised to at once look for a new supply, or to install a modern filtration plant which may be depended upon to give at all times an unpolluted water.

The report on the water supply of Toronto showed that although the water as delivered to consumers is somewhat better in quality than the water from the Ohio River, it cannot be regarded as a safe or satisfactory supply and the authorities were advised to seek a better supply or improve the present one by the introduction of a suitable filtration system.

The results of the examination at Wellston showed the present water supply to be subject at times to gross pollution, as well as being insufficient in quantity during dry seasons. The engineer also investigated several sources proposed for a new supply and reported upon five possible methods in which a supply satisfactory in quality from a sanitary point of view may be obtained. The authorities were furnished with a copy of the report ,and were advised to secure the services of a competent engineer and when definite plans were made to submit the same to the State Board of Health for approval.

Upon the request of the health officer the investigation of the sanitary conditions of a public school at West Mansfield was made, April 26th. A report, setting forth recommendations for improving conditions was sent to the health officer.

The special assistant engineers have made investigations at the following places:

Water filtration plants: Batavia, Gallipolis, Marietta and Pomeroy.

June 3rd the superintendent of the water works and the board of trustees of public affairs at Batavia were advised that the results of the tests made of their plant show that it has not been giving satisfactory results owing to poor management. Their attention was called to the fact that the poor results were due to the floating outlets to the settling basins not having been repaired and also to the filter being operated at too great a rate; that the character of the raw water is such as would require the best possible efficiency of the filter and the hope was expressed that the changes in operation, as suggested, would receive immediate attention.

Sewage purification plants investigated were: Ashland, Clyde, Delaware, Kenton, Lancaster, Mansfield, Marion, Sandusky and Toledo.

Matters acted upon by mail should now be taken up for confirmation.

Respectfully submitted,

C. O. Probst,

Secretary.

AUGUST MEETING.

A special meeting of the State Board of Health was held at the Hotel Victory, Put-in-Bay, August 30, 1907, at 4 P. M.

There were present Messrs. Stanton, Hartzell, Palmer, Crossland and the Secretary.

The minutes of the June meeting were read and approved.

Mr. E. G. Bradbury, consulting engineer, and Mr. H. D. Freeman of Columbus, appeared before the Board and explained changes in plans for sewage purification works for the village of Grandview, which they requested the Board to approve.

The Secretary read his Quarterly Report, which, on motion of Dr. Stanton, was received and filed for publication.

Plans for a sewage purification plant for the village of Chagrin Falls were presented, with a report of the chief engineer of the Board.

On motion of Dr. Crossland, seconded by Dr. Palmer, it was voted to approve these plans, as shown on drawings submitted by the Walter P. Rice Engineering Company, consulting engineers, on July 19, 1907, provided:

1st. That the operation of the plant be at all times satisfactory to the State Board of Health;

2nd. That samples of the filtering material for the contact filters be submitted to and receive the approval of the State Board of Health before this material is used; and,

3rd. That the plant be enlarged in a manner satisfactory to the State Board of Health when the number of persons contributing sewage to the plant reaches 2,000; such enlargement being necessary at that time, in the opinion of the said Board.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Palmer and Crossland.

In the negative, none.

Plans for sewers and sewage disposal for the village of Grandview, with a report by the chief engineer of the Board, were presented.

On motion of Dr. Palmer, seconded by Dr. Crossland, it was voted to present this question to the absent members and give them an opportunity to file with the Secretary any objections they might have to the approval of these plans, with the understanding that the question of approval be resubmitted to the Board for a mail vote with copies of objections, if any, made by the members not present.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Palmer and Crossland.

In the negative, none.

Mr. E. G. Bradbury, as consulting engineer, presented the following communication in regard to change of site for the proposed disposal plant at Medina:

"The village of Medina has found it impossible to secure the site proposed for the South sewage disposal plant except at exhorbitant figures, and by request of the council I respectfully ask that they be allowed to construct said plant on the northerly side of Champion Creek as shown on sketch submitted to your engineer.

"The proposed change brings the plant to a point about 600 feet from three small houses on Smith Road, but as the plant is to be in the valley at the foot of a steep hillside, and thus shut off from sight and out of the way of cross winds, it is believed that no objectionable results will follow.

"The arrangement of plant itself will be materially improved by the change, as the septic tanks will be placed adjacent to the filters and the inverted siphon done away with."

It was moved by Dr. Stanton, seconded by Dr. Palmer, to approve the plan, submitted by E. G. Bradbury, August 21, 1907, showing the proposed change of location of the southerly sewage purification plant for Medina (which was approved in July, 1906) providing for the location at a point two or three hundred feet farther north.

Those voting in the affirmative were Messrs, Stanton, Hartzell, Palmer and Crossland.

In the negative, none.

The Secretary presented a communication from Charles A. Hammond, village solicitor for Oberlin, requesting that the Board authorize the construction of a sewage disposal plant providing for not more than one and one-half acres of filtering area, but of the same type as the two acre plant already sanctioned by the Board.

On motion of Dr. Palmer, seconded by Dr. Stanton, it was voted to approve the plans for a sewage disposal plant with a filtration area of one and one-half acres provided that the area be increased whenever, in the opinion of the State Board of Health, an increased flow of sewage makes this necessary, and that plans showing the proposed sewage disposal plant in detail be first filed with the Board.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Palmer and Crossland.

The Secretary was instructed to notify the authorities that an official approval would be sent them when the detail plans had been received and submitted to the Board.

In the negative, none.

The Secretary presented a letter from Dr. W. H. Hickey, protesting against the construction of a sewer in a ditch running through the village of Leipsic.

No action was taken.

A communication was presented from F. A. Williams of Youngstown, Ohio, requesting permission to remove the remains of his cousin, Harrison J. Wolfe (Williams) from the city of New York to Youngstown, the cause of death having been smallpox. This application was accompanied by a letter from the health commissioner of New York City, Dr. Thomas Darlington, giving permission to disinter the body.

On motion of Dr. Crossland, seconded by Dr. Palmer, it was voted to grant permission to bring the body to Youngstown for interment, provided the body be placed in a new metallic lined box, hermetically sealed, and provided further, that the consent of the board of health of Youngstown and a permit to inter the body be first secured.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Palmer and Crossland.

In the negative, none.

The Secretary presented plans for a storm water sewer for the village of Milford, designed for the abatement of a nuisance, and also a report by the assistant engineer, Mr. Hansen, upon said plans.

On motion of Dr. Stanton, seconded by Dr. Crossland, it was voted to approve the plans for this storm water sewer, as submitted by the health officer of Milford, Dr. Con W. Gatch, August 24, 1907, provided:

1st. That the proposed sewer be constructed of vitrified sewer pipe laid to an even grade and with carefully cemented joints;

2nd. That at each change of direction or grade or intersection with other sewers there be placed a properly constructed manhole;

3rd. That the proposed sewer intercept all existing sewers between Locust Street and the proposed outlet, and that the existing sewers where necessary be reconstructed to even grade so as not to permit water to stand stagnant along their inverts;

4th. That the existing cistern on Locust Street, from which the proposed sewer is to start, be removed and that there be constructed in its place a suitable catch basin that will not permit the accumulation of putrescible wastes;

5th. That at the end of the existing sewer in Locust Street there be placed an automatic flush tank or manhole, by means of which, or through which, the sewer may be thoroughly flushed;

6th. That an ordinance be passed by council, prohibiting the additional discharge of putrescible wastes or sewage into the proposed sewer or existing sewers that may become tributary thereto; (This should not be taken to mean a certain amount of wash water and sink drainage that unavoidably finds its way into gutters); and,

7th. That before construction, more detailed plans and specifications embodying the above conditions be submitted to the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Palmer and Crossland.

In the negative, none.

The Secretary was instructed to call attention to the fact that the proposed sewer is only for the purpose of bringing about immediate relief from certain of the most unsanitary conditions now existing in the village and that ultimate and permanent relief can only be obtained by the construction of a suitable system of sanitary sewers.

The Secretary presented a report upon some examinations that had been made in the laboratory in regard to bacteria found on coins.

Matters previously acted upon by mail were taken up for confirmation as follows:

It was moved by Dr. Palmer and seconded by Dr. Stanton to confirm the Board's action approving the amendment, July 5th, of Conditions 1 and 2 of the letter of approval of April 29, 1907, of a proposed sewerage system for Eaton, to read as follows:

"1st. That the sand filters be enlarged to an area of one acre for the first installation, and that plans showing this enlargement be submitted to and receive the approval of the State Board of Health; and,

2nd. That a further increase in the area be made when the average daily flow of sewage reaches 100,000 gallons (which flow is estimated to represent a population of 1,200 people using the sewers); if the State Board of Health at that time deems such enlargement necessary."

Also the provision that council pass a resolution directing that no person be allowed to use the sewers without first obtaining a permit from said council, and that an accurate record of all connections be kept.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Crossland, to confirm the Board's action approving, July 1st, detailed plans for sewage purification for Wadsworth, submitted by John W. Holl, consulting engineer, June 18, 1907, provided:

1st. That the management of the plant be at all times satisfactory to the State Board of Health;

2nd. That samples of all filtering material be submitted to and approved by the State Board of Health before being placed; and,

3rd. That plans of the automatic controlling device, when selected, be submitted to and receive the approval of the State Board of Health before such apparatus is placed.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Palmer and Crossland.

In the negative, none.

The Secretary was instructed to notify the board of trustees of public affairs that the site for the sewage purification plant was not entirely satisfactory on account of its proximity to two small houses and

was approved by the State Board of Health in 1903 with the idea that these houses would be included in the property to be purchased for sewage purification purposes.

It was moved by Dr. Stanton and seconded by Dr. Corssland to confirm the Board's action, August 16th, approving the proposed change of site for the sewage purification plant for Wadsworth, 500 or 600 feet farther removed from habitation than the site first considered, as shown on drawings submitted by John W. Holl, consulting engineer, August 5, 1907.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Crossland and seconded by Dr. Stanton to confirm the Board's action approving, July 1st, plans for sewerage, including a new outlet, for a portion of District No. 5, in the city of Dayton, as shown on drawings submitted by F. O. Eichelberger, assistant city engineer, June 21, 1907, provided the outlet of the sewer be so constructed that the sewage will be discharged, by means of an iron pipe, below the low water level of the river at all times.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Palmer and seconded by Dr. Crossland to confirm the Board's action, July 15th, approving plans for sewage purification for the Girls' Industrial Home, Delaware, as shown on blue prints submitted on July 8th, by Messrs. Bradbury and Shute, consulting engineers, upon the following conditions:

1st. That the operation of the plant, including the character and amount of chemicals to be used, be at all times satisfactory to the State Board of Health;

2nd. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being placed; and,

3rd. That detail drawings of the automatic discharging devices in the dosing tank and of the sprinkling nozzles be submitted to and receive the approval of the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Palmer and Crossland.

In the negative, none.

The Secretary was instructed to call the attention of the trustees to the importance of providing for disconnecting from the sewers the down spouts from the roofs of the various buildings in order that the plant might not be overworked at times of rain.

It was moved by Dr. Stanton and seconded by Dr. Crossland to confirm the Board's action approving, August 23rd, 1907, the detailed

drawings of the automatic regulating and dosing devices, screen, sprinkling nozzles, and manhole covers, for use with the proposed sewage purification for the Girls' Industrial Home, Delaware, as shown on three drawings submitted August 1, 1907, by E. G. Bradbury and George P. Shute, engineers for the institution, in accordance with Condition No. 3 of the approval given July 15th, 1907.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Crossland and seconded by Dr. Palmer to confirm the Board's action, July 23, 1907, disapproving plans submitted by E. G. Bradbury and George P. Shute, consulting engineers, on June 11, 1907, for sewerage and sewage disposal for property owned by The Ohio Realty and Construction Company, located in the village of Grandview, Franklin County, and recommending that the village authorities consider the proposition of connecting the sewers from this property and other territory of the village to the Columbus sewer system.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Palmer and seconded by Dr. Stanton to confirm the Board's action approving, August 6, 1907, plans for proposed sewerage for the Clinton and 3rd Street District, Steubenville, as shown on drawings submitted by S. B. Curfman, city engineer, on July 12, 1907, provided that the main outlet be so constructed that the dry weather flow will be conveyed below the lowest water level of the river at all times.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Crossland to confirm the Board's action approving, August 7, 1907, plans for two proposed storm sewers for New Philadelphia, to be located in South Broadway and adjacent streets, as shown on drawings submitted by C. J. Knisely, city engineer, August 1, 1907, provided council first pass an ordinance prohibiting the use of these sewers for domestic purposes of any kind and file a certified copy of such ordinance with the State Board of Health. (Council passed such ordinance August 9 and the same was filed with the Board August 12, 1907).

Those voting in the affirmative were Messrs Stanton, Hartzell, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Crossland and seconded by Dr. Palmer to confirm the Board's action approving, August 19, 1907, the water supply of the Wilmington Water and Light Company, and also the use for water

works purposes of land owned and controlled by that company, bounded on the northwest by Prairie Avenue, on the southeast by the Cincinnati and Muskingum Valley Railroad, on the southwest by Wall Street, and on the northeast by the Lewis farm (as shown on plan filed with the State Board of Health); provided that no house or source of contamination be located within 500 feet of any well.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Palmer and Crossland.

In the negative, none.

The Secretary was instructed to advise the authorities that in order to detect any possible deterioration in the quality of the water, samples of the aggregate supply and from Well No. 2, should be submitted to the Board for analysis at least once a month during the coming year.

It was moved by Dr. Palmer and seconded by Dr. Stanton to confirm the Board's actions approving certain health officers, appointed by council to serve in lieu of a board of health:

Those voting in the affirmative were Messrs. Stanton, Hartzell, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Palmer and seconded by Dr. Stanton to confirm the Board's action disapproving the appointment by council of Dr. J. E. Bayliff as health officer of Uniopolis, to serve in lieu of a board of health.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Palmer to confirm the Board's action approving rules and regulations adopted by health officers serving in lieu of a board of health in the following places: Grove City, Holgate and Loramie. The rules adopted were the same as those recommended by the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Palmer and Crossland.

In the negative, none.

There being no further business the Board adjourned.

Attest: C. O. PROBST,
Secretary.

REPORT OF THE SECRETARY.

August Meeting.

Mr. President and Members of the Ohio State Board of Health,

Gentlemen: — Your Secretary begs leave to offer the following report:

SMALLPOX.

We are still having cases of smallpox throughout the state; 161 cases having been reported since the last meeting. These were distributed in counties as follows:

Ashtabula 2, Auglaize 3, Brown 1, Cuyahoga 5, Darke 4, Defiance 4, Franklin 1, Fulton 1, Hamilton 6, Hardin 4, Henry 3, Huron 62, Logan 1, Lorain 2, Lucas 35, Miami 1, Richland 6, Seneca 4, Shelby 5, Stark 2 and Wood 9.

Six of these cases were reported in Cincinnati, five in Cleveland, one in Columbus and 31 in Toledo.

The disease is still prevalent in Franklin, Logan, Richland and Wood counties.

Dr. Platter visited Dunkirk on July 23rd to investigate an outbreak of smallpox; and Glouster July 24th on account of diphtheria. These are the only visits made by a medical inspector.

The Secretary, by invitation, addressed the Toledo Academy of Medicine on June 14th; and the Richland County Medical Society, at Mansfield on June 19th, on the subject of smallpox.

On July 2nd, he delivered an address, by invitation, to the Gallia County Medical Society at Gallipolis, on the subject of tuberculosis.

July 6th, Dr. Warner and the Secretary visited Grandview, a suburb of Columbus, to look into the question of sewage disposal for The Ohio Realty and Construction Company, plans having been submitted for the Board's approval.

At the June meeting Dr. Miller and the chief engineer were appointed a committee to visit Oberlin to look into the question of whether a smaller area could be used in constructing the sewage disposal plant approved by the Board, the authorities having made such request. Dr. Miller being unable to go, the investigation was made by Mr. Hartzell and the chief engineer on July 21st.

June 16th, Dr. Warner, who was appointed a committee at the last meeting, visited Uniopolis to adjust, so far as possible, difficulties that had arisen in the appointment of a new health officer. You received a

copy of his report and voted to disapprove the appointee, as recommended.

June 26th, Dr. Chapman and the chief engineer, as a committee, visited Eaton relative to their proposed sewerage system.

July 19th, upon request, the Secretary visited Eaton and addressed a public meeting in regard to the necessity for sewerage in that village. July 22nd, we were notified that the vote on the sewerage proposition had resulted in 759 for and 67 against the improvement.

July 13th, plans for a proposed enlargement and extension of a sewer in Sandusky, to discharge into Sandusky Bay at the foot of Arthur Street, were submitted to the Board for approval.

The matter was referred to a committee, consisting of the president and the chief engineer, who visited Sandusky July 17th, and made a report. A copy of this report was furnished the board of public service, the mayor and the city engineer.

The committee reported that no more unpurified sewage should be discharged into Sandusky Bay until an improved water supply is obtained; that the water supply and sewerage situation at Sandusky was in an unsatisfactory condition, and advised that the city secure the services of an expert engineer to carefully study these matters.

July 20th, Dr. Crossland investigated a complaint made by residents of Zanesville, of the improper drainage near the intersection of Sheridan and Euclid avenues in that city. He reported that the condition was caused by a private sewer draining into a ravine, and that it was necessary to have the drain to carry off surface water. A letter was addressed to the board of public service, stating that it appeared to be necessary, for the health and welfare of all parties concerned, to continue this sewer and connect it with the city sewer in the immediate neighborhood, and they were asked to consider such a proposition.

July 25th, Dr. Stanton visited Hartwell, the board of health of that village having adopted a resolution requesting the State Board of Health to stop the villages of Wyoming and Lockland emptying sewage into a railroad ditch and thereby causing a nuisance. He reported that in time of drought the conditions would be very objectionable and a menace to health, and advised the local board of health that the discharge of house sewage into this stream was without permission from the State Board of Health and that they should seek relief by injunction.

August 16th, a member of the board of public service of Ironton called at the office and asked whether the Board would sanction the carrying out of a contract for the installation of the wells and the laying of the intake pipe to a point within a short distance of their pumping station. He was informed that I could see no objection on the part of the Board to the carrying out of such contract, or the letting of any other contract embraced in the construction of their new water works provided

that such contracts were in accordance wtih the plans approved by the State Board of Health January 23rd, 1907.

The chief engineer has visited Beachland, a portion of Nottingham; Camp Perry, Cleveland (relative to sewerage for Chagrin Falls), Conneaut, Coshocton, Dayton, Dillonvale, Garrettsville, Girard, Grandview, Milan, Oberlin, Sandusky and Toledo.

June 24th, the clerk of the board of education of Dillonvale asked permission to construct a sewer for a new schoolhouse, to discharge into Short Creek.

The chief engineer visited Dillonvale, made an inspection of conditions and also investigated the question of a proposed water supply for the school. He made a report, recommending that a small sewage purification plant be put in to take care of the drainage from this school house, which could be quite simple and inexpensive. A copy of his report was furnished to the clerk of the board of education, and also to the mayor, and a hope expressed that the village authorities would take up seriously the question of a new water supply and sewers, which apparently are greatly needed to insure the healthfulness of the village.

August 7th, at the request of the health officer, the chief engineer visited Conneaut to investigate a nuisance caused by the disposal of wastes from a tannery on low ground. He reported that the owners of the tannery should build a covered tank, of a capacity of 15,000 to 20,000 gallons, to receive these wastes and allow the solid matter to settle out, the tank to be cleaned when necessary, and if the effluent from the tank should prove to be offensive, it could be further purified.

A copy of his report was sent to the owners of the tannery and to the health officer of Conneaut.

The plant at Blanchester for the purification of the waste from the creamery of French Brothers was not working satisfactorily. The bacteriologist visited Blanchester July 10th, advised those in charge in regard to cleaning the plant, with satisfactory result.

They have been having trouble recently at Sunbury from creamery wastes. This is one of the largest plants of the kind in the state, making about 4,000 pounds of butter a day and having about 1,500 gallons of waste liquors to dispose of. They have installed some purification but the plant is not satisfactory. The engineer and bacteriologist have made two visits to Sunbury and given advice in regard to changes and improvements in the plant which, it is hoped will now satisfactorily care for their waste products.

In this connection I would say that we are pursuing our investigations for the best way to purify creamery wastes and hope to issue a special report, giving details of a satisfactory process, within a short time.

The special assistant engineers have made investigations in the following places:

Water filtration plants. Fostoria, Geneva, Marietta, Newark, Port Clinton, Rocky River, Upper Sandusky, Vermilion and Warren.

Sewage Purification Plants. Alliance (Fairmount Children's Home), Ashland, Canton, Camp Perry, Collinwood, East Cleveland, Geneva, Glenville, Delaware, Kenton, Massillon, Lakewood, Oberlin, Shelby and Warrensville.

Investigations have been made by the assistant engineer in the following places: Ansonia, Bradford, Milford, Minster, New Bremen and Sunbury, in response to complaints; Ashtabula, Dayton, Fremont, Gibsonburg, New Richmond, Painesville, Port Clinton, Salem, Springfield, Wilmington and Willoughby in regard to existing water supplies; Geneva to examine the sewage disposal plant, and Oberlin to assist in a test of their softening plant.

In connection with the special report to be made on the collection and disposal of garbage in Ohio cities, the assistant engineer has visited Cincinnati, Cleveland and Toledo, where he collected data in regard to the manner and cost of such disposal.

May 27, the health officer of Milford requested an investigation of a nuisance created by the discharge of liquid wastes into a storm sewer, which in turn has its outlet in a depression formed by an old mill-race; the accumulation in this depression creating a serious nuisance and constituting a menace to the public health.

June 18th, the assistant engineer visited Milford and made an investigation. His report pointed out two ways in which temporary relief might be effected, and advised that the village be urged to install a system of sanitary sewers. A copy of this report was furnished the health officer and the council.

June 20th, a petition was received from thirty-nine citizens residing in or near the swamps of Stillwater Creek, which rises in or near Jackson Township and flows through Brown and Richland townships, Darke County, complaining of the unsanitary condition of the creek and swamps and stating that hundreds of acres of land become flooded two or three times a year, leaving the water standing for weeks, which becomes stagnant and filthy, causing sickness.

In response to this petition the assistant engineer was sent to that locality on July 9th, to make an investigation and report.

His report showed that the conditions complained of were due to lack of drainage, caused by the absence of a proper ditch, and that it would be a great improvement to have this land properly drained.

A copy of the report was sent to the petitioners, in which it was advised that they secure the services of a consulting engineer and also an attorney, to make plans and apportionment which would be satisfactory to the county commissioners as well as themselves.

July 3rd, a letter was received from the mayor of Minster, request-

ing an investigation of certain sanitary evils existing in that village, and an examination relative to the introduction of a system of sewers.

The assistant engineer visited Minster July 8th, and found little improvement in sanitary matters since his investigation of an outbreak of typhoid fever in the village some months previous. His report showed that the principal reasons for desiring the construction of new sewers were to provide for storm water drainage, and the abatement of the nuisance caused by the discharge of creamery wastes into a local ditch.

A copy of the engineer's report was furnished the mayor and council, and they were urged to take steps, without further delay, to improve sanitary conditions, and especially to make provision for a sewerage system, securing the services of a competent engineer to make plans, etc.

As it would probably be some time before a sewerage system could be constructed and put in use, they were also advised to take some action to protect their wells against pollution from vaults, and that their health officer should enforce provision for the construction and cleaning of vaults, as recommended in the report of our engineer on the prevalence of typhoid fever at Minster, made December 4th, 1906. This advice was also given the health officer.

While in Minster July 8th, the assistant engineer also investigated two sewers, discharging into the Miami and Erie Canal, built since 1893, but plans for which were not submitted to this Board for approval. He found that one of the sewers received sink drainage from several residences and a large quantity of woolen mill waste. During the summer, when the flow of water in the canal is small, this waste undergoes putrefaction and constitutes a very serious nuisance. The existence of such sewers, offering a convenient method to persons in the neighborhood for disposing of obectionable wastes, tends to make persons so favored opposed to the introduction of a suitable system of sanitary sewers, of which Minster is greatly in need.

The attention of the chief engineer of the Board of Public Works was called to the matter of the discharging of objectionable wastes through these sewers into the canal.

While in New Bremen, July 8th, the attention of the assistant engineer was called to a nuisance created by the discharge of wastes from a creamery into a ditch having no natural summer flow. He made an investigation and report, which showed that the nuisance could not be abated until a suitable purification plant is installed.

The conditions at this creamery being representative of the conditions in many other localities in the state, it was deemed advisable to conduct experiments at New Bremen with reference to securing information upon which to base advice to be given similar plants in the future. I therefore wrote the proprietor of this creamery, stating that we would make various tests of methods of purification, putting one of

our engineers in charge of the work and bear that part of the expense, if he would be willing to construct an experimental plant at a reasonable cost. The mayor and health officer were also notified of this offer.

In response to a request from the health officer of Bradford, the assistant engineer visited that village July 10th and made an investigation of the general sanitary conditions with reference to the advisability of permitting the discharge of sewage and other putrescible wastes into existing sewers. His report indicated that the only satisfactory and permanent solution of the objectionable conditions existing is a properly designed and complete system of domestic sewers, with sewage purification; that it is important, until such a sewer system is built, that rules and regulations relative to the construction of privies be enforced. The report outlined such rules and suggested an ordinance to be passed by council forbidding the use of existing drains and ditches for carrying off unpurified sewage. As the Pennsylvania Railway Company has a cesspool (or so-called purification plant) discharging into one of the drains, a copy of the report of the engineer was sent to that company as well as to the health officer of Bradford.

August 24th, the health officer notified me that council had refused to pass such an ordinance.

August 3rd the Board was asked to make an investigation of an outbreak of typhoid fever at Coshocton. The chief engineer and two assistant engineers visited Coshocton the next week and their investigation showed that thirty-five or forty cases of the disease were traceable to infection by milk from one dairy; undoubtedly the result of improper or careless handling of the milk, though it was impossible to discover with certainty the primary case or cases that infected the milk.

In order that the milk from cows belonging to this dairyman be not wasted, it was suggested that this milk be used temporarily in connection with another dairy.

A full report of the outbreak was later sent to the health officer, with proper instructions for dealing with the dairy. A set of rules and regulations for protecting the city's milk supply, for the adoption of the local board of health, was, by request, furnished them.

Reports were made by the assistant engineer on the existing water supply in the following places: Athens, Athens State Hospital, Canal Dover, Findlay, Jackson, Nelsonville, Newcomerstown, Paulding, Strasburg, Scio and Wilmington, copies of which were sent to the authorities.

The report showed that the original water supply of Athens, as well as additional supplies, had been installed without submitting the matter to the State Board of Health. The water at the present time was found to be of good quality and suitable for domestic purposes, although the analyses indicated that it had at some former time been contaminated to a certain extent, but had been purified before reaching the wells. The authorities were advised in regard to reconstructing several privies

located within a few hundred feet of the water works, and were also notified that any additions made to the public water supply should be submitted to and approved by the State Board of Health.

The examination of the supply at Canal Dover showed the water to be of safe quality from a sanitary standpoint, but as there are numerous sources of possible pollution of the public supply, which might affect the water to a dangerous degree, the authorities were advised of the importance of having the supply analyzed at least once a month for a period of a year, in order that fuller information might be had as to its safety.

The report indicated that the quality of the water at Findlay during most of the time is satisfactory, but that a sample, collected last March, soon after a freshet, revealed the fact that the water of the public supply was being influenced by surface drainage, and the authorities were advised that a very careful examination of the springs and of the entire system should be made in order to ascertain the cause of this contamination. They were also advised that in order to prevent the unrestricted use of the Blanchard River supply the valve on the old intake should be closed and locked and the key placed in the custody of the health officer; and as there were evidences of failure of obtaining a sufficient supply by the gravity method, the city of Findlay should take steps toward installing suitable means for pumping water from the wells into the pipe line.

The examination showed the supply of Nelsonville to be of good quality at present, but owing to the porous nature of the soil in which the well is located, they were notified that it would be advisable for the city to obtain control of all land surrounding the well for a distance of at least 500 feet; and also, on account of the shortage of the supply during dry seasons, to make tests in the near future in regard to increasing the supply.

The water supply of Newcomerstown was found to be of very good quality at present, from a sanitary standpoint. The authorities were, however, advised that the privies in the immediate vicinity of the water works, being a menace to the continued purity of the supply, should be at once reconstructed and provided with water-tight receptacles at or above the surface of the ground, where they may be readily inspected and removed for cleaning, and as soon as possible a water-tight sewer should be laid in the street and all houses compelled to make connection thereto.

The water supply of Paulding was found to be of good quality from a sanitary standpoint. It was learned that the council of Paulding had failed to pass the ordinance required in the Board's approval, November 4th, 1905, of an 8-inch storm sewer in South William Street, with outlet into Flatrock Creek forbidding the tapping of this sewer for the purpose of admitting household wastes of any kind. The attention of the authorities was called to the matter.

The water supply of Jackson was found to be of good quality, though, for appearances, there is too much iron in the water. This, however, might be removed by the installation of a suitable plant.

As Salt Creek may be used in an emergency, and as the creek is polluted and unsafe, the authorities were advised that the valve controlling the emergency intake should be kept locked and the key placed in the custody of the health officer, so that if it becomes necessary to use the water it may be done with his knowledge. They were also advised that the cost of operation of their present pumping equipment would be materially reduced by the installation of better machinery.

The water supply of Strasburg was found to be in general use, though it was approved in 1903 by the State Board of Health for fire protection only. The Board's fears of the pollution of the supply, on account of the unsatisfactory location of the wells, have not been realized, but as they do not have positive assurance that pollution may not occur, the authorities were advised to have monthly analyses of the water made to determine seasonable changes, if any, in the character of the water, the analyses to be made in the State Board of Health's laboratory, without expense to the village except for the transportation of the samples.

The supply at Scio was found to be satisfactory for drinking and domestic purposes. The authorities were advised of certain precautions to be taken in regard to the disposal of sink drainage and the removal of the privy belonging to the house of the pump-man, as a safeguard.

The report showed that the water supply of Wilmington is at the present time of safe quality from a sanitary standpoint. The authorities were advised, however, in order that any deterioration may be readily detected, that monthly analyses be made for a period of one year.

Matters previously acted upon by mail should now be taken up for a viva voce vote.

Respectfully submitted,

C. O. Probst,

Secretary.

OCTOBER MEETING.

A regular meeting of the State Board of Health was held at the Hotel Sinton, Cincinnati, on Wednesday evening, October 16, 1907.

There were present Drs. Palmer, Warner, Stanton, Crossland and Mr. Hartzell.

The minutes of the last meeting were read and approved.

The Secretary presented his report, which was received and ordered filed for publication.

The Secretary spoke of some matters relating to the approval of plans for water supplies and sewerage systems, recommending that a conditional approval of plans, with details to be supplied later, should not be granted where it is possible for the plans to show such details at the time they are acted upon. He stated further that at times plans were not given sufficient consideration as they were presented immediately before Board meeting, or at Board meeting.

On motion of Dr. Warner, duly seconded, it was voted that hereafter in approving plans for water works and sewerage systems a conditional approval of plans, with details to be submitted later, should not be granted where it is possible for the plans to show such details at the time they are acted upon; and that no plans be approved unless presented in sufficient time for an investigation and report by the engineer. The Secretary was instructed to ask for a sufficient appropriation to provide for the frequent inspection of public works of this character while under construction, in order to insure that the plans as approved had been carried out.

In relation to this matter it was further moved by Dr. Warner, and duly seconded, that duplicate plans for water supplies and sewerage be required and that one copy of the plans as finally approved be returned to the municipal authorities and one copy be kept on file in the office of the Board.

The Secretary reported that he had had a conference with Mr. E. G. Bradbury, consulting engineer for the Girls' Industrial Home, at Delaware, in reference to plans for the sewage disposal plant for that institution; that Mr. Bradbury represented that it was impossible to construct the sand filters of the size first proposed at the estimated cost except with the use of an inferior quality of sand. He stated that by reducing the area of the filters from 52 ft. square to 46.7 ft. square each, and cutting the side embankments on slopes of $1\frac{1}{2}$ to 1 instead of vertical, a proper quality of sand could be used, and furthermore, that

even with this reduction in filtering area a maximum rate of 250,000 gallons of treated sewage per day would be possible. This is a larger quantity of sewage than it is ever expected to have at this institution.

As the board of trustees were to meet on Tuesday, October 15th, when it was necessary to close the contract for the work or abandon it for the season, it was important that this change in plans be authorized. Accordingly, he notified Mr. Frank C. Hubbard, a member of the board of trustees of the Girls' Industrial Home, that there would be no objections to this modification.

On motion of Dr. Stanton, seconded by Mr. Hartzell, the action of the Secretary, as stated above, was confirmed.

The Secretary read, for the information of the Board, the following letter, which he had sent to the board of public service of Ironton, October 9th, 1907:

"I am informed by one of your reliable citizens that some important changes have been made in the plans for your new water works system since the plans were approved by the State Board of Health; namely, that there is some change in the piping system of the infiltration wells, as shown in the plans of the original plant, and that the gate valves which cut off each cluster are omitted. If this report is correct, revised plans should be submitted to the State Board of Health for approval at once, and you would not be justified in going ahead with the work until such revisions had been approved by the Board.

Hoping to hear from you in reference to this matter, I am."

The Secretary presented plans and report by the engineer for the water filtration plant for the city of Sandusky. He stated that some time previous to the meeting the then president, Mr. Hartzell, and the chief engineer, Mr. Pratt, had visited Sandusky and looked into the general sanitary condition there. They reported that in their judgment it would be unwise for the city to make use of polluted bay water even with purification, and urged that the matter be further looked into. The suggestion was not heeded.

Dr. Warner moved that the plans as presented be disapproved. After considerable discussion this resulted in the following vote:

In favor of the motion, Drs. Stanton, Crossland and Warner.

Opposing, Mr. Hartzell.

Plans and a report by the assistant engineer, Mr. Hansen, upon a proposed storm water sewer for the village of Nelsonville, were presented.

On motion of Mr. Hartzell, seconded by Dr. Warner, it was voted to approve the plans submitted by Mr. Emmitt Keenan, president of the council, September 18th, 1907, upon the condition that no sanitary sewage be permitted to enter this sewer.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Warner, Palmer and Crossland.

In the negative, none.

The Secretary presented a bill for the appointment of County Medical Officers of Health and explained its provisions. He stated that the general features of the bill had been approved by the State Medical Association, but with the recommendation that the county commissioners be eliminated from the bill and that the salaries of these officers be paid by the State instead of their respective counties.

Dr. Stanton spoke of a proposed act to regulate the establishment and provide for the inspection of maternity boarding-houses and lying-in hospitals; the State Board of Health to have the enforcement of the act.

After some discussion, the Secretary was instructed to say to the author of this bill that in the opinion of the State Board of Health such Board was not the proper authority to be charged with the enforcement of this act and to suggest that it would be better to have the Board of State Charities take charge of it.

Matters previously acted upon by mail were taken up for confirmation.

It was moved by Dr. Stanton, seconded by Dr. Palmer, to confirm the Board's action of September 24th, 1907, approving plans for proposed sewerage and sewage purification for Orrville, submitted by L. E. Chapin, consulting engineer, on August 29th, 1907, provided:

1st. That the sewage purification works be constructed before the proposed sewers are placed in use.

2nd. That chambers be placed at the inlet to each contact filter, so that apparatus for controlling the application of sewage may be readily installed if found necessary in the future; and that such apparatus be installed when deemed necessary by the State Board of Health.

3rd. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being placed in the filters; and,

4th. That the method of operation of the purification works be at all times satisfactory to the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Warner, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Palmer, and seconded by Dr. Crossland, to confirm the Board's action of October 7th, 1907, approving the plans, drawn by Messrs. Bradbury and Shute, consulting engineers, for sewerage and sewage purification works for a portion of the village of Grandview, submitted on June 11th, 1907, provided the effluent of the sand filters be disposed of by discharging upon the land immediately south of the plant, and that at least one acre be suitably graded and gravel ditches constructed to receive the effluent.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Warner, Palmer and Crossland.

In the negative, none.

The Secretary was instructed to notify the authorities that plans showing this graded area must be submitted for subsequent approval.

It was moved by Dr. Warner and seconded by Dr. Stanton to confirm the Board's actions approving health officers, appointed by their respective councils, to serve in lieu of a board of health.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Warner, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Warner to confirm the Board's action approving the rules adopted by the health officer of Oakley, which were the rules recommended by the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Hartzell, Warner, Palmer and Crossland.

In the negative, none.

On the motion of Dr. Stanton, the President and Secretary were authorized to make all arrangements for the joint meeting with municipal health authorities in January, 1908.

It was voted that a resolution of thanks be extended to the Board of Trustees "Commissioners of Water Works" of Cincinnati for their great kindness in enabling the Board to make a satisfactory visit and inspection of the new water works plant and filtration works.

There being no further business, the Board adjourned.

Attest: C. O. Probst,
Secretary.

REPORT OF THE SECRETARY.

October Meeting.

Mr. President and Members of the Ohio State Board of Health,

Gentlemen: — Your Secretary begs leave to offer the following report:

Since the last meeting, August 30th, but seven cases of smallpox have been reported; three in Cincinnati, two in Dayton and one each in Akron and Ashland.

No visits were made on account of smallpox.

Upon request of the mayor, Dr. Platter visited Summerfield, Noble County, on account of an outbreak of diphtheria. He reported that there had been five cases and one death, four of the cases occurring in the family of one of the physicians. Proper quarantine is now being enforced.

There has been an unusual prevalence of diphtheria during the past three or four weeks, 230 cases and 15 deaths having been reported. Of these 61 cases and 4 deaths were in Cleveland; 48 cases and 4 deaths in Cincinnati; 25 cases and 1 death in Portsmouth; 23 cases and 2 deaths in Columbus; 12 cases and 1 death in Crooksville; 9 cases, 1 death in Logan; 8 cases in Fostoria and 6 in Ripley.

The child who died at Logan was attending school when taken sick, and this, together with the fact that all the physicians were not reporting their cases, led the health officer to close the schools.

One hundred and two specimens have been examined in the laboratory for diphtheria since our June meeting, 47 being positive and 55 negative.

Since my last report, in June, we have distributed 1035 packages of antitoxin to local boards of health; 495 immunizing doses and 540 curative.

This represents a cost to the local boards of $1,269.25, while the regular market rate would have been $3,248.00, a saving of $1,979.00 to the local boards of health.

The Vice President, Dr. Palmer, and the Secretary attended the meeting of the American Public Health Association at Atlantic City; and the chief engineer, Mr. Pratt, attended the meeting of the New England Water Works Association at Springfield, Mass.

Dr. Stanton visited St. Bernard in response to a complaint of a nuisance arising from the closets of St. Clemens School. He reported

that the sewerage system of St. Bernard was accessible to these closets and that the village regulations provided for the cleaning of vaults. The attention of the health officer was called to the matter and samples of water from the cisterns furnishing water to the pupils of the school were examined. The examination showed the cisterns to be grossly polluted and it was advised that their use be abandoned until the cisterns were properly cleaned and the water protected from future contamination.

The chief engineer visited Beach Park, relative to a water supply introduced by the Lake Shore and Michigan Southern Railway Company; Vermilion in regard to a nuisance, and Camp Perry relative to water supply and sewerage.

The assistant engineer visited Delaware relative to the examination of existing water supplies; and the following places were visited by one of the special assistant engineers: Bucyrus, in regard to a proposed water supply; Mansfield, to inspect the sewage plant; Shelby, to inspect the operation of the neutralizing plant, and Lorain, Elyria and Vermilion, in connection with the special investigation of water purification plants.

Complaint was made of the unsanitary conditions in Vermilion caused by the south side sewer. September 6th, the chief engineer made an investigation, and reported that this sewer affords drainage for nearly half the houses in town; that most of them use it for sink drainage; that there are some fifteen or more water closets connected with it, and that a nuisance undoubtedly exists there which should be abated.

The fact that they have a public water supply makes it imperative, if they are to have modern conveniences, that a system of sewers for domestic purposes be installed; and a communication was addressed to the mayor and council urging that steps be taken to have plans made for a complete system of sewers that would be such that all future sewers should be built in accordance therewith, and that an ordinance be passed prohibiting all further connections for waste of any kind with the south side sewer. Their attention was also called to the fact that this sewer had not been approved by the State Board of Health and that they would be expected to take some action within a reasonable time to complete as much of a general sewerage system as is necessary to abate the nuisance now caused by the south side sanitary sewer.

The health officer of Marion Townhip, Marion County, called attention to the fact that something was being emptied into Rock Swale ditch, (which in turn empties into the Scioto River,) that was killing the fish and polluting the water to the extent that a nuisance was being created. One of the special assistant engineers visited the locality on September 10th, but a heavy rain fell at the time and the nuisance was thus abated.

The health officer of Perry Township, Wood County, complained of the pollution of Portage Creek below the discharge of the sewage of

Fostoria. On September 9th, one of the special assistant engineers visited the locality and made a thorough inspection of the creek. His report shows that a nuisance exists, due to the pollution of the stream by acid iron pickling liquors and by partially clarified sewage, discharged into it. The iron liquors, however, are soon to be discharged into sewers, and the removal of the pollution by a part of the sewage of Fostoria can be readily and practically accomplished by requiring the authorities of Fostoria to purify all the sewage of the city under dry weather conditions.

Matters acted upon by mail should now be taken up for confirmation.

Respectfully submitted,

C. O. Probst,

Secretary.

PUBLIC WATER SUPPLIES.

REPORT OF PROPOSED ADDITIONAL WATER SUPPLY FOR CADIZ.

On March 6, 1907, the assistant engineer visited Cadiz for the purpose of making a general examination of the public water supply, and while there learned of a new well that had been recently drilled and was being used to supplement the water supply which was approved by the State Board of Health in 1895. Conditions were investigated and the following report was made:

The public water supply of Cadiz has for a number of years been derived from deep wells located about 800 feet to the northwest of the built-up portion of the town in the valley of a small brook. This supply was duly approved by the State Board of Health in 1895. (For detailed description of supply, see "Report on the Public Water Supply of Cadiz," April 18, 1907.)

In 1904, the old wells having greatly decreased in their yield, it was found necessary to seek an additional supply. A well was accordingly drilled about 4,000 feet to the south of the old wells. A description of the new well together with a sample of the same was submitted to the State Board of Health, and the approval of the Board was duly given. This well being at such a great distance from the pumping station, was uneconomical to operate and was accordingly abandoned several years later.

In October, 1906, a new well was drilled in a small valley to the north of the town and was connected with the present suppy. This well is 137 feet in depth. It seems to pass through about the same formation as do the old wells. The formation penetrated was approximately 25 feet of surface drift, shale, sandstone, slate and limestone. The water-bearing stratum in the sandstone, which corresponds to the water-bearing stratum in the old wells, was encountered at about 80 feet. Another water-bearing stratum was encountered at 130 feet, but this did not add greatly to the yield. The water from the drift is cased off by a steel casing which extends to the rock. The surroundings of the well are not all that could be desired. Five hundred feet to the southeast are a number of houses that lie on the edge of the built-up portion of the village; to the north about 300 feet is a large residence; to the south, distant about 300 feet, is a dump on which is deposited various sorts of refuse including some garbage; and also about 150 feet to the south is a saw-mill. All of the houses mentioned as well as the saw-mill have outdoor privies. It is further stated, though this was not verified, that nearby is an abandoned coal mine which receives the discharge of sewage from one of the hotels of the village. The well is pumped by means of an air lift, the air being piped from the pumping station. The air lift discharges into two wooden oil tanks, each having a capacity of about 4,000

gallons. A small boiler feed pump pumps the water from these tanks through a pipe line to the collecting well at the pumping station. The new well is said to add about 12,000 gallons per day to the supply, the total consumption being in the neighborhood of 70,000 gallons. A sample of the water was taken from the new well as it came from the discharge pipe of the air lift. The analysis of this sample shows the water to be of good quality and uninfluenced by any of the surrounding sources of contamination. (See laboratory report for analysis.)

CONCLUSIONS.

It will appear that the water proposed for the additional supply is suitable in quality from a sanitary standpoint, but owing to the unsanitary surroundings, no new wells should be placed in service without first notifying and receiving the approval of the State Board of Health.

If feasible, it would be desirable to find a different location for public supply wells, far removed from any possible sources of contamination.

It may be suggested that a sufficient quantity of water might be obtainable from wells located in the valley of the same brook in which the old wells are located but 1,000 feet farther down stream.

May 24, 1907, the Board approved this proposed additional water supply for Cadiz, to be derived from a well, 137 feet deep, located in the valley north of the village and one-half mile from the main supply which was approved in 1895.

The authorities were advised that, before drilling any new wells, the question of approving the location of such wells should be submitted to the State Board of Health; and of the importance of having the water for the present supply analyzed at regular intervals in order to detect any deterioration in quality.

REPORT ON PROPOSED WATER SUPPLY AND SEWERAGE FOR CAMP PERRY.

At the meeting of the State Board of Health, held April 24, 1907, plans for a water supply and sewerage system for Camp Perry were submitted by Colonel E. T. Miller, assistant quartermaster general of Ohio. These plans were reported upon by the chief engineer as follows:

Camp Perry is the new camp and rifle range of the Ohio National Guard. It is situated on the shore of Lake Erie, four miles west of Port Clinton. It is proposed to use this camp for regular military practice, and it is also expected that national rifle shoots will be held there. Ordinarily the camp will be used by but one regiment at a time, that is, from 600 to 1,000 men. At times of national shoots there may be 2,000 or

3,000 people present for a period of two weeks. There is a possibility of the number being increased beyond this; although in case of general mobilization of troops in time of war, the Newark Camp Grounds, being more centrally located, would probably be used.

During the coming season it is expected that there will be an average of 600 men on the ground in July; 150 to 200 during the first two weeks of August; and then there will be some 2,500 for a period of two weeks. The maximum daily consumption during the first season will not exceed 100,000 gallons. The average flow will closely approximate the water consumption.

The matter of estimating the probable water consumption and sewage output is somewhat difficult, as the conditions in camp may be quite different from conditions pertaining to the ordinary municipality. Figures obtained from the United States Government show that the consumption per capita in permanent camps does not exceed thirty gallons per day. In the case of Camp Perry there will be a permanent sewerage system to which will be connected the water closets used by the men.

The plans provide for drawing the water from the lake at a point 400 or 500 feet from the shore near the easterly limits of the camp grounds. This water is to be pumped to two slow sand filters each having an area of 1,000 square feet. Each filter is designed to have a maximum capacity of 150,000 gallons per day. One filter is to be built immediately; but it is expected that the second will not be finished until the end of this season or the first of next.

The sewage is to be collected in a 10-inch main sewer and will flow by gravity into a reservoir from which it is to be pumped intermittently on to four sand filters having an area, as shown on plans, of one-half acre. The sand is to be of the best quality of lake sand. On this account and also because the filters will be operated for two or three months in the year, it will be possible to operate them at a rate much higher than could ordinarily be used with filters which are used the year round. At least one-half of the area shown on the plans will be completed at once.

The effluent from the sewage filters will flow in a long ditch, or narrow pond, which is below the lake level. The contents of this pond, consisting of ground water and purified sewage, will be pumped into the lake every two or three weeks. If desired, the contents of the pond can be readily sterilized by treating with copper sulphate, a few hours before pumping, as an additional safeguard. The pumping may be done when the wind is blowing towards the west or away from the water intake.

May 20, 1907, the Board voted to approve these plans provided:

1st. That it be understood that the maximum capacity of the water filters, for short periods, is not greater than 300,000 gallons per day; and that the permanent capacity of the sewage filters, for short periods, is not greater than 125,000 gallons or the sewage produced by 2,500 people;

2nd. That the operation of the water and sewage plants be constantly under the supervision of trained men; that care be taken to secure the greatest efficiency at all times; and that the methods of operation be at all times satisfactory to the State Board of Health;

3rd. That the complete area of the water filters and of the sewage filters, as shown on plans, be constructed before the beginning of the 1908 season;

4th. That the water and sewage filters be further enlarged when found necessary by the State Board of Health; and,

5. That the contents of the ditch which receives the sewage effluent be treated with chemicals, for purposes of sterilization, in a manner to be prescribed by the State Board of Health, before pumping into the lake.

REPORT ON PROPOSED WATER SUPPLY FOR IRONTON.

January 23, 1907, Mr. Alexander Potter of New York, consulting engineer for the city of Ironton, submitted detailed plans for proposed new water works for that city. Mr. Potter also submitted a communication to the Board, setting forth the necessity for building the reservoir shown in his plans as soon as the new supply was used. At the meeting of the Board, held on the evening of January 23, a member of council and the superintendent of water works of Ironton, addressed the Board, urging approval of these plans.

The chief engineer of the Board reported upon the plans as follows:

In September, 1906, the State Board of Health considered an application from the officials of Ironton for approval of a new water supply to be obtained from wells located in a gravel deposit on the Kentucky side of the Ohio River opposite the upper end of the city of Ironton. After a thorough inspection and collection of samples from test wells, this source of supply was approved, November 21, 1906, upon the following conditions:

1st. That completed plans showing detail arrangements of the proposed supply be submitted to the State Board of Health for approval as soon as these plans are made;

2nd. That a filtration plant, of a design satisfactory to the State Board of Health be installed whenever this is deemed necessary by said Board;

3rd. That the distance between wells shall be figured in the following manner: The average rate of filtration through the gravel shall be figured at the rate of 2,000,000 gallons per acre per day, and sufficient area shall be provided about each well so that this rate shall be maintained. The cross-sectional area within the wells shall be such that the draft from any well shall not exceed 4 gallons per square foot per minute;

4th. That a sufficient number of wells be used so that the combined interior cross-sectional area of all the wells shall equal at least 250 square feet; and,

5th. That samples of water drawn from the wells be submitted for chemical and bacteriological analyses at intervals not greater than three months.

The plans now submitted comply with conditions 1 and 3 of the above approval.

The plans provide for twelve wells in three groups of four each, and the arrangement of the wells has been made in accordance with suggestions offered by the State Board of Health and based largely on the experience at Gallipolis, where an excellent water supply is being obtained under somewhat similar conditions.

Each well consists of an inverted dome 4 feet in diameter and 5 feet high, resting upon a crib work. The bottom of the dome is about 8 feet below the low water level in the river and 9 or 10 feet below the gravel bar.

Each group of wells is connected through 10-inch or 12-inch cast-iron pipes into a 14-inch sub-main leading into the principal 20-inch suction main which extends down the bed of the river for a distance of about three-quarters of a mile to the pumping station. The water will be drawn directly from the wells by pumps located at this point and forced to a reservoir on high ground north of the city. Arrangements are made by which the wells can be thoroughly back flushed, thus loosening the material around them when necessary. This procedure has been found to be of great advantage at Gallipolis.

The reservoir proposed will hold over 1,000,000 gallons. It is necessary to have this reserve supply in order that the wells may be back flushed when necessary and also to provide against emergencies. Furthermore, such a reservoir would be necessary in case a filter plant is installed later, in accordance with the second condition of the above approval of the source of supply.

The Board, at the meeting held January 23, 1907, approved these plans of Mr. Alexander Potter, provided:

1st. That the reservoir shown on plans, or a reservoir holding at least 1,000,000 gallons, be included in the project and constructed before the water from the new source of supply is offered to consumers; and,

2nd. That a sufficient number of wells be used so that the combined interior cross-sectional area of all the wells shall equal at least 250 square feet.

At a meeting of the State Board of Health held April 24, 1907, Mr. T. T. Johnson, chairman of the special committee of council of Ironton, appeared before the Board and requested that it reconsider its action of January 23, 1907, as regards condition No. 1, relating to the installation of a reservoir. He stated that the council did not feel that there

was enough money to complete the entire work if this reservoir were installed, and that in any case council desired to build a larger reservoir than that proposed, if any were built. He further stated that the plans as approved by the Board had not been formally approved by the council, but had been submitted by the authority of the board of public service.

On April 30, 1907, the chief engineer visited Ironton, met the special committee of council and the city solicitor, and discussed the matter with them; and reported as follows:

With the proposed scheme at Ironton, the installation of a reservoir is necessary in order to provide for back flushing the wells. These wells, as described in former reports, are shallow. They consist of iron domes 4 feet in diameter by 5 feet high, the bottoms being about 8 feet below the river bottom, and arranged in clusters as described above. They are designed with the idea of having the system built as nearly as possible in accordance with the conditions which govern artificial filtration. Storage of purified water, therefore, for washing the filtering material and also for supplying the city while the wells are out of service, is necessary as a precaution for securing the best operation.

The only similar scheme which has been successful is that at Gallipolis, and it is believed that the success of this system is largely due to the ability to back flush when necessary.

Somewhat similar schemes have proven unsuccessful in several places, and the Ironton scheme, in accordance with the second condition of the approval of November, 1906, is approved with the condition that a filtration plant be installed if deemed necessary. It seems wise, therefore, to take all possible precautions in making this scheme successful; and furthermore, if a filtration plant is built in the future, a reservoir will then be absolutely essential.

The Board, May 17, 1907, after reconsidering its action taken January 23, 1907, voted to reaffirm the action of that date, requiring the construction of a reservoir as a part of the new water works system.

REPORT ON PROPOSED WATER SUPPLY AND WATER PURIFICATION FOR JEFFERSON.

On May 31, 1907, there were submitted by Messrs. Chapin and Knowles of Canton, plans and description of a proposed new water supply and filtration plant for the village of Jefferson. The chief engineer and the assistant engineer having at different times visited Jefferson in connection with a proposed water supply, these plans were reported upon by the chief engineer as follows:

Jefferson is a village of about 1,400 inhabitants, located in Ashtabula County of which it is the county seat. At present there is neither a

water supply nor sewerage system in the village. Several disastrous fires have occurred within the last few years, and this has urged the officials to provide an adequate water supply. In addition to fire protection, the supply will be used for general domestic purposes.

The first attempt to obtain a water supply was made by drilling five or six wells in the southeastern portion of the corporation. These wells varied in depth from 29 to 50 feet and passed through 12 or 13 feet of clay underlaid by Erie shale. The territory in the vicinity of the wells was rather flat and there were several dwellings within a few hundred feet. Furthermore, the quantity, which was shown by a pumping test to be available from these wells, was insufficient for a public supply.

On account of the above circumstances and in accordance with the advice, informally given, of the State Board of Health, the village abandoned the well water project and has taken steps toward procuring a surface water supply from Mill Creek and filtering it; and plans in accordance with this scheme are now submitted for approval.

Mill Creek, above the village of Jefferson, has a watershed of about twenty-five square miles, which is devoted principally to farming and is very sparsely settled, the estimated population per square mile being only about ten. There are probably no domestic sewers which discharge into the stream. There may be a few surface drains discharging at points where highways cross the stream. The flow of the stream, according to the best available information, is at all times amply sufficient to supply the village. The water is clear for a large portion of the time, but is turbid for periods of several days following rains.

The intake is to be located near the highway bridge at a point about two miles northwest of the center of the village and just above the confluence of Mill Creek with the small run which flows through the village. The water is to be purified by mechanical filtration.

The plans contemplate supplying at least 1,000 people with water. At 100 gallons per capita, this will mean a water consumption of 100,000 gallons per day. The purification works are planned for an ultimate capacity of 400,000 gallons per day of twenty-four hours. It is proposed to operate the works, at the beginning for a period of eight or ten hours each day. The capacities of the filters and pumps, however, as described below, will enable this to be safely done without using excessive rates of filtration.

The plans show two intakes, one opposite the pumping station which is about 100 feet above the highway bridge, and the other 700 feet above. Both consist of 10-inch sewer pipe laid to grade, discharging into a pump well. It is planned to construct the lower one first and the upper one at some future time.

There are to be two concrete gravity filters, each 8 x 18½ feet, lo-

cated in a building adjacent to and practically a part of the pumping station.

The water is first raised into a sedimentation and coagulation tank, 16 feet in diameter, holding about 37,000 gallons or one to two hours' flow under the proposed method of operation. From this tank the water will flow on to one or both filters, as desired. The flow on the filters is to be regulated by a float valve.

Each filter is to contain one foot of selected gravel from $\frac{1}{8}$ to $\frac{3}{4}$ inch in size, and 32 inches of filter sand having an effective size of 0.42 m. m. The underdrainage system is to consist of simply galvanized iron pipe, to be pierced with holes 3/32-inch in diameter and 2 inches on centers.

The coagulant devices, rate controllers and loss of head gages have not yet been provided for.

The filters are to be supplied with wash water from the water main. Ample pressure will be available. No provision has been made for agitating the filtering material. The troughs which distribute the raw water on to the filters and which are used to carry away the dirty wash water, are to be placed at an elevation of about twenty inches above the top of the sand. An ample and satisfactorily arranged system of piping is provided for applying the raw water to the filters, for draining the filtered water, for back flushing the filters, for conveying the dirty wash water to the sewers, and for wasting the filtered water into the sewers as desired.

It is understood in a letter from the consulting engineer that the floor of the pipe pit will be made lower than the elevation shown on plans in order to provide for placing controllers and for relocating the raw water main so that it will not pass through the clear water well.

The clear water well, which holds 50,000 gallons, is located directly beneath the filters and pipe gallery. This is constructed of concrete and extends about ten feet below the natural surface of the ground.

For forcing the filtered water into the distribution system there are to be provided two direct acting steam pumps, each about 10 x 7 x 10, or a single 12 x 8.5 x 12 pump. Each pump will have a suction to the raw water well and also to the clear well, with a discharge to both sedimentation basin and to the force main, so that either pump can be used on either service.

The distribution system is to consist of 7,490 feet of 8-inch cast iron pipe, 12,670 feet of 6-inch, and 17,950 feet of 4-inch. The force main is to be 6 and 8 inches in diameter.

An elevated tank, 100 feet high and holding 40,000 gallons, is to be located in the center of the village. This will give a pressure at all points in the village of about forty pounds.

At a meeting of the State Board of Health, held June 12, 1907, these plans were considered for a new water supply and water purification works for Jefferson, as shown on drawings and in the description sub-

mitted by Chapin and Knowles, consulting engineers, on May 31, 1907. The Board approved the plans provided:

1st. That the management and operation of the plant, the use of the coagulant, and the rate of filtration be at all times satisfactory to the State Board of Health;

2nd. That detailed plans showing method of controlling rate of filtration be submitted to and receive the approval of the State Board of Health before the plant is built; and,

3rd. That detailed plans of the sedimentation basin and of the coagulant apparatus be submitted to and receive the approval of the State Board of Health before the plant is built.

REPORT OF AN EXAMINATION OF THE PUBLIC WATER SUPPLY OF NORWOOD.

At the request of the health officer of Norwood, one of the special assistant engineers visited that city on August 29, 1907, and made an examination of the public water supply. The following report was submitted:

Norwood is a city of about 20,000 population, situated just north of Cincinnati on the divide between Duck and Mill creeks. Although a suburb of Cincinnati, it contains also several large manufacturing establishments and would probably be rated as a manufacturing rather than as a residential city.

The public water supply was first installed in 1894 and, briefly, consists of a system of deep driven wells from which the water is lifted by compressed air into a receiving basin and from the latter is finally pumped to a standpipe. The supply has in general been satisfactory, although as the consumption has increased, it has been necessary to add to the supply by driving new wells.

At the recent examination of the water works plant, it was stated by the engineer, Mr. J. W. Huddleston, that the supply was being pumped from five driven wells, four of which have been in use since the original installation, while one, No. 5, has only been used since February, 1907. The first four wells vary in depth from 260 to 284 feet, while No. 5 was drilled to a depth of 400 feet and has a considerably greater capacity than any of the others.

Before well No. 5 was added to the supply, it was the custom to pump under an air pressure of 70 pounds per square inch, but the greater lift required for No. 5 necessitated a pressure of about 88 pounds. With the use of this higher pressure and a corresponding increase in temperature, considerable trouble has been experienced on account of the disagreeable odors and tastes in the water, caused by the lubricating oil

forced into the supply through the compressor. The latter is of the Corliss type, requiring about two gallons of lubricating oil per day, and its design is such that all of this oil is carried into the supply.

At the time of the examination the inner tube in well No. 5 had been pulled up so that the lift was about 300 feet, and the compressor was working at a pressure of 74 pounds per square inch. Since this change has been made there has been very much less trouble from odors and tastes due to the lubricating oil, and at the time of the examination practically no odor or taste was noticeable in the supply. The rate of pumping during the test was 1,500,000 gallons in fifteen hours.

In general it should be stated that the system of wells is located in a section of the city that is rather thickly built up, but it is thought that the considerable depth of the supply together with the introduction of sewers and the general cleanly condition of the neighborhood would make the apparent danger of pollution from adjacent property but slight. It is a well-known fact that ground water supplies are at times subject to pollution that is carried through the underground strata for considerable distances, but information on this matter relative to the Norwood supply can only be obtained by a more thorough and comprehensive examination than was made at this time.

At the recent examination five samples of water were collected for chemical and bacterial examinations, as follows: From the tap at the pump at the water works plant; from well No. 5; from the residence of Mrs. Myers, 4810 Pine Street; from the residence of Mrs. Leist, 4212 Elsmere Avenue; and from the residence of Dr. J. C. Cadwallader, health officer, 4320 Main Avenue. The results of the chemical and bacterial analyses of these samples are shown in the following table:

Source.	Col n in		Bact. per c.c.	Parts Per Million.		Hardness.	
	1 cc.	100 cc.		Chlorine	Iron	Temp.	Total
Tap at pump	no	no	260	13.0	0.6	284	316
Well No. 5	no	no	37	8.2	0.6	282	301
Tap — 4810 Pine St.	no	no	170	—	—	—	—
Tap — 4212 Elsmere Av.	yes	yes	800	—	—	—	—
Tap — 4320 Main Av.	no	no	600	10.8	0.4	274	299

The chemical results above indicate a hard water in which, however, the incrustants are unusually low, showing that the water is derived largely from limestone strata. The iron contained, namely, 0.5 part

per million, is so low that no trouble should be encountered from the precipitation of iron.

The bacterial results are not as satisfactory. Those samples from the pumping station, also from 4810 Pine Street (which is relatively near the station) show a satisfactory water, having low bacterial content, and the absence of intestinal organisms is indicated by the absence of coli. Farther from the pumping station, however, the samples obtained were not as good, that from 4212 Elsmere Avenue, which is located near a dead end, showing coli or intestinal bacteria present in considerable numbers. There was also a marked increase in the total number of bacteria contained in this sample.

These results would indicate that while the water at the plant at the time of examination was of good quality, not long previous the supply had been contaminated, the pollution remaining in those pipes from which there had been but little draught.

It is also interesting to note that the water from well No. 5 is of lower bacterial content than the average as obtained from the pump, which would tend to show that the deeper water was of better quality than that obtained from the more shallow wells.

In conclusion it should be stated that the water supply of Norwood is apparently contaminated at times, the pollution probably affecting one or more of the shallower wells. The source and amount of this pollution can only be determined by a thorough study of the location and surroundings of the wells, together with a more detailed examination of the quality of the water from the different units.

Just previous to the examination of the supply, there had been an unusual prevalence of typhoid fever in Norwood. The health officer stated that sixteen cases of the disease had been reported during July and August. Up to the fifteenth of the month but one case has been reported in September and that undoubtedly was contracted outside of Norwood. Whether or not the above sixteen cases were due to a temporary pollution of the water supply can only be determined by a detailed examination into the history of each case.

Blanks were furnished the health officer for a detailed report of each case but he was unable to supply this information.

A copy of this report was sent to the health officer of Norwood, Dr. J. C. Cadwallader, Septembe[illegible], 1907, with the recommendation that a more extensive investigation of the conditions at the plant be made.

REPORT ON THE WATER SUPPLY AND SEWERAGE OF SANDUSKY.

On June 13, 1907, plans for the proposed enlargement and extension of a sewer to discharge into Sandusky Bay at the foot of Arthur Street.

were submitted to the Board for approval. Before acting upon these plans a committee, consisting of the president of the Board and the chief engineer, visited Sandusky on July 17, 1907, met the city engineer and discussed the general situation in regard to water supply and sewerage of the city. The following report was made by the president of the Board, and a copy was sent to the Sandusky officials:

PURE WATER FOR SANDUSKY.

When the authorities of Sandusky submitted to the State Board of Health certain plans for the improvement of the sewer having its outlet into the bay at the foot of Arthur Street it was deemed expedient for the committee of the Board to visit that city; not that the sewer referred to needed any such attention, but because of the action recently taken looking toward the filtration of the city's water supply.

It is proposed to take the water for the filter plant from the bay by the present intake. The cost is considerable. The sanitary welfare of the people of Sandusky warrants careful consideration as to the wisdom, or unwisdom, of an enterprise which must have such intimate and permanent relations with the health of all the people. The well studied lesson of experience, and of present practice by sanitary engineers, is that the city water should be obtained from a source of greater purity, outside of the malign influences of Sandusky Bay.

The bay is safely land-locked, and constitutes one of the best harbors on Lake Erie. It already receives the effluents from seventeen sewers. Both chemical analysis and typhoid history have shown how pollution is on the increase. No board of health could permit additional outlets, or any increase of sewage entering the bay, so long as its waters constitute the city's supply.

The serious significance of the facts just hinted at must have been obvious to the people when they voted the money to build a filtering plant. If the procurement of a safer water was impossible the wisdom of filtering, first the sewage, and then the bay water, might pass unchallenged. Such is not the situation at Sandusky. Water free from sewage contamination can be obtained from Lake Erie, and this at less comparative cost than other communities have incurred, always to their great and permanent advantage.

In the course of a recent report to the New England Water Works Association Mr. Allen Hazen, one of the most eminent of American sanitary engineers who make a specialty of filtration, says:

> "The experience of the past decade has shown that well constructed and well operated filters are capable of protecting those who use the water, from diseases otherwise conveyed. It has also shown, unfortunately, that as filters are actually built and operated these results are not always obtained. It will not do to regard the filtration of a water as a sure protection against the evils which might result from the use of the raw water."

Mr. Hazen adds, as the result of his large experience, that "The value of a pure water is always many times greater than the cost of purifying it." No investment can be compared to that which assures a pure water supply. Railways, factories, the showy architecture of public buildings, all these are desirable for certain interests. How slender are their claims in comparison with the blessing of pure water for all! Indeed what factor can be more potent in the upbuilding of a city, in adding to its wealth and attractiveness, in inducing an influx of permanent residents of the best class, than a well grounded repute for an unlimited supply of pure water?

The giant strides in Chicago's growth followed upon the expenditure of forty millions in order that no sewage might reach the city's intakes, which are in open water and miles away from the shore. Cleveland's four-mile intake and ten-mile intercepting sewer must be, more than any other factor, credited with that city's recent prodigious growth.

In making such costly changes it is not safe to be governed by past immunity (and Sandusky's record is by no means perfect in that respect) by a comparative immunity due to fewer inhabitants, fewer factories, and fewer dangerous wastes; but rather by the experience of older cities that have for many years been compelled to cope with problems complicated by dense and growing populations, with increasing wastes and with constantly intensified pollution; especially cities of the old world which by their civilized practices, as shown by their health reports, put to shame the reckless waste of health and life that beclouds the fair name of most of our American cities.

The German practice is most suggestive and most instructive. German thoroughness is proverbial. In this vital field that quality is unhampered by politics or makeshift policies. Thanks to these facts the German Imperial Board of Health has waged such a successful warfare against preventable diseases; against the dangers to public health arising from contagions and infections, that these have been well nigh banished from the imperial domain.

The employment of the typhoid death rate per 100,000 inhabitants as the measure of water pollution is universal. For the five years ending in 1894 the record for six Continental cities was as follows: The Hague, 4.9; Rotterdam, 5.2; Dresden, 6.9; Vienna, 7.0; Munich, 7.1; Berlin, 8.0. Contrast these figures with the record made by six American cities during the same years, namely: Boston, 32.6; Baltimore, 45.8; Cleveland, 49.2; Cincinnati, 52.4; Chicago, 84; Pittsburg, 91.7.

Naturally it is only the trained medical man who can truly appreciate the melancholy significance of these figures, by assigning to each fatality the average number and duration of additional illnesses; also the frightful havoc made by other intestinal troubles directly due to the same infective causes.

And now we see such a campaign in behalf of purity as never before gladdened the heart of the well-wisher of mankind. Boston, although already possessing water less liable to suspicion than that of Sandusky Bay, has bought watersheds by the thousands of acres, reaching up into New Hampshire, and is stripping the ground surface of every vestige of human pollution. Baltimore has expended a huge sum in the same direction. Every one knows what has been done in Cleveland and Chicago. Cincinnati has established a new and costly intake, and supplements that with an unrivaled filter plant. Pittsburg abandons the Allegheny River and sends a conduit after water from the mountains and filters that. Our own Columbus, after showing what cruel wreckage of public health can be made by the use of filthy water, has finally shaken off the fatal incubus of parsimony and politics; has safeguarded her sources of water, has provided filtration both for the water coming from above, and for the city's sewage passing in below. Think of Liverpool, a city which had water superior in quality to that in use in many other cities, going up into the mountains of Wales and bringing water through a conduit over forty miles long, and filtering the same before it is delivered; of New York City, which has inaugurated work on her new sources of water supply, not to get a water that can be filtered into a high degree of purity, but to get pure water direct from the skies; it is an engineering work that relegates the aqueducts of the ancient Caesars to an inferior place in the second class.

Filtration is of such importance that it ought to be regarded as indispensable for all our surface waters here, as it is in Europe. The lake water is clear, soft, and when unmixed with sewage or other organic wastes, is popularly spoken of as pure. As a matter of fact this purity is only relative; there is no real purity without filtration.

While filtration has firmly established itself as a scientific precaution, it is equaled, probably over-ranked, in importance by the need of a source of supply undiluted with sewage. Filtration, whether by the mechanical or slow-sand process, exacts constant care and attention. Careless mechanical filtration has resulted in epidemics of typhoid in Lake Erie cities. Filtration through sand involves the necessity of frequent scraping and changes of material constituting the upper portion of the sand bed. Human nature is variable and fitful. Our American home elective system sometimes makes us the prey of such weakness. Before proceeding farther in their most laudable effort to improve the quality of their city water the authorities of Sandusky ought to obtain expert engineering advice as to the safest course to be pursued in order to assure the purity and wholesomeness of the municipal water supply.

In spite of this advice the authorities of Sandusky decided to install the filtration plant without material change in the source of supply.

On September 16, 1907, there were received from Mr. William Ohlemacher, president of the board of public service of Sandusky, plans and

specifications for a water purification plant for that city. The contract had already been let.

These plans were referred to the chief engineer who made the following report:

DESCRIPTION OF PROPOSED PLANT.

The proposed mechanical filtration plant is to be of the modern type, of concrete construction, and will have a capacity of six million gallons, the pumping machinery and main piping being designed to allow an increase to ten million gallons. As the present daily water consumption averages about four million gallons and is not increasing rapidly, a six million gallon plant for present installation will probably suffice.

Pumping Machinery. There will be installed two 10-inch side suction low lift horizontal centrifugal pumps, directly connected to vertical engines. Each pump will have a capacity of over ten million gallons per twenty-four hours. The suction of these pumps will be tapped into the present intake, and a valve will be so placed that the high duty pump can draw unpurified water directly from the intake when necessary.

An air compressor directly connected to a steam engine with a capacity of delivering air under five pounds pressure at a rate of 2,000 cubic feet per minute, will be installed for washing the filters. There is also to be a wash water pump with a capacity of 7,000 gallons per minute.

Preliminary Treatment. The raw water pumps will discharge into a 24-inch concrete conduit leading to two sedimentation and coagulation basins, each 28′ x 168′ x 16′ and holding together one million gallons or four hours' flow based on a six million gallon capacity. Each basin will be baffled by a wall running longitudinally through the center. The outlet from the basins is controlled by an adjustable weir which allows the coagulated water to discharge into a 30-inch concrete canal through which it is conveyed to a 30-inch pipe line located in the pipe gallery and which supplies the filters.

The coagulant devices are arranged for using either sulphate of alumina or sulphate of iron and lime. There are to be four concrete solution tanks, each 8′ x 7′ x 8′ and provided with stirring machinery. Pumps will lift the solution through these tanks to head tanks, four in number, from which it will flow to the discharge of the 10-inch raw water pumps, the flow of coagulant being controlled by an orifice. The chemicals are to be delivered to the solution tanks by means of charging boxes, each having a capacity of 375 pounds of alum.

Filters. There are to be six filters, each having a net capacity of 1,000,000 gallons per day. The elevation of the filters will be such that the water will stand in them at the same elevation as it is in the coagulation basins and will be controlled by the adustable weir in the above mentioned basins. The depth of water usually carried on the filters will

be about three feet. Each filter is 18′ x 20′; the rate of filtration, therefore, will be 120,000,000 gallons per acre per day. There are to be 36 inches of sand and 9 inches of gravel. The size of the filtering material is not specified, although the contractor states that he will be governed by the specifications for the Columbus, Ohio, filtration plant.

The strainer system is to consist of four 8-inch cast iron manifolds closed with blank flanges at each end. These manifolds are to be tapped every six inches with 1½-inch holes, into which are to be screwed 1½-inch nipples and 1¼-inch extra heavy galvanized iron collector pipes with strainers every six inches. The strainers are not described but are said to be the type used by the American Water Works and Guarantee Company. A sample is to be submitted to the State Board of Health for approval.

Into each manifold, within three inches of the end, is tapped the 4-inch air pipe. The bottom of the filter is to be smooth and nothing is to appear above it but the strainers. The main inlet to the filters is a 14-inch cast iron pipe. The filtered water outlet is 12 inches in diameter. The wash water inlet is 14 inches and the wash water outlet 16 inches. A 4-inch re-wash pipe is also provided.

The filters will be washed by means of the wash water pump mentioned above. Air agitation will also be used. The proposed rate of washing is to be one foot vertical rise per minute, and provision has been made to increase this to two feet vertical rise per minute, if found necessary. The air will be supplied to the filters under about four pounds' pressure, which is expected to be sufficient to force through the sand six cubic feet of air per minute per square foot of area. The gutters are to be 14 inches deep and 10 inches wide; detailed section is shown on plans. The 16-inch wash water outlet discharges into a 20-inch sewer located some ten feet below the surface of the sand.

It is suggested, though not definitely specified, that the rate of filtration be controlled by enclosed rate controllers designed on the pressure disc principle; detailed drawings of these are submitted. Loss of head gages, if desired, are also to be installed.

Four more filters can be readily installed when necessary, and as mentioned above, the pumping and main piping will be of sufficient size to permit of their proper operation.

Storage for Filtered Water. A concrete filtered water basin is to be located directly between the filters. This basin is to have a capacity of 800,000 gallons. The plans show the basin to be 16 feet deep, but it may be decided to change the shape somewhat and carry the basin deeper. With a capacity of 800,000 gallons, there will be available three hours' storage when the filters are operating at their nominal capacity. This storage in connection with the present storage in the standpipe, will be safe. When the basin is full, the level of the water will be about ten feet below the level of the water in the filters.

Guarantee of Efficiency. The contractor guarantees the successful working of each plant, and also that the purity of the effluent shall be satisfactory to the State Board of Health. Ten per cent. of the contract price is to be withheld until the plant has been proved to fulfill the guarantee. The following guarantee of purification has been made.

"The purification obtained shall be such that in no case shall the average number of bacteria in the filtrate exceed 100 per cubic centimeter, except when the number of bacteria in the applied water shall exceed 2,500 c. c. in which event the average reduction of bacteria in the filtrate shall be at least 98 per cent.

Not more than five per cent. of the individual samples of the filtrate shall show more than 150 bacteria per c. c.. not more than five per cent. of the samples after filtration shall show an efficiency of less than ninety per cent. No trace of undecomposed coagulant shall be left in the filtrate nor shall the filtrate show any increase in iron or alumina. The filtrate shall show no acid and be bright, clear and practically free from color, turbidity or matter in suspension, and shall be furnished at the rate of six million (6,000,000) gallons per day."

This purification is to be effected when the plant is yielding six million gallons per day and when using not more than five per cent. of wash water.

November 6, 1907, the following letter was sent to the board of public service at Sandusky:

"At the last meeting of the State Board of Health your application for approval of plans for a proposed water filtration plant for the city of Sandusky was considered; the plans being those shown on drawings submitted by Mr. William Ohlemacher, president of the board of public service, on September 16, 1907.

"The Board was unanimously of the opinion that the advice given in a recent comunication to your board (to study in a thorough manner, with expert assistance, the best solution of the water supply of your city) should be sustained. However, as the Board is not called upon to approve any change in your present intake, and the installation of a filtration plant, if constructed in the best possible manner and properly operated, will undoubtedly very greatly improve your present water supply, it has voted to approve the plans mentioned above upon the following conditions:

"1st. That the operation of the plant, including the kind and amount of coagulant used, be at all times satisfactory to the State Board of Health;

"2nd. That a storage capacity for filtered water, of at least 800,000 gallons, be provided before the plant is placed in operation.

"3rd. That samples of strainers to be used be submitted to and receive the approval of the State Board of Health before the strainers are placed;

"4th. That samples of the filtering material and specifications therefor be submitted to and receive the approval of the State Board of Health before this is placed;

"5th. That there be submitted for approval detailed drawings showing method to be used to create equal flow through sedimentation basins and to maintain the same level in both basins;

"6th. That there be submitted detailed plans and description of laboratory;

"7th. That there be submitted detailed drawings showing method of making walls of clear well water-tight;

"8th. That there be submitted full detailed plans showing how strainer system is to be installed;

"9th. That the re-wash valve be arranged so that it can be opened and closed from the operating floor;

"10th. That automatic rate controllers, as shown on plans submitted or of other design satisfactory to the State Board of Health, be installed before the plant is placed in operation;

"11th. That loss of head gages be installed before the plant is placed in operation;

"12th. That the valve which controls the admission of unfiltered water to the distribution system be placed under lock and key, kept in the possession of the health officer, and that unfiltered water shall be used only in times of emergency and with his knowledge; and,

"13th. That the plant be constructed under the immediate supervision of an inspector, representing the board of public service and the city engineer, experienced in matters relating to the construction of filtration plants."

REPORT ON PROPOSED WATER SUPPLY FOR WILMINGTON.

On June 6, 1907, Mr. J. C. Martin, secretary of the Wilmington Water and Light Company, asked for formal approval by the State Board of Health of the Wilmington water works. Wilmington was visited on June 12, 1907, by the chief engineer and on June 22, 1907, by the assistant engineer. The following report was made:

The installation of water supply for Wilmington was first considered by the State Board of Health in 1902. At that time wells Nos. 1 and 2 of the present supply, located in the northeasterly part of the village, were approved upon the condition "that all surface water be effectually excluded from the wells." At this time the complete water works were not installed. The two wells approved above were temporarily provided with a small steam pump and the water was used for street sprinkling.

Later, in 1905, the question of completing the water works and providing an adequate supply was again taken up. It was proposed to increase the supply from wells located in a different portion of the village, near Locust and Spring streets. An examination of these wells by the State Board of Health, however, showed them to be unsatisfactory and this project was disapproved.

Soon after, in May, 1905, at the informal suggestion of the Board, additional wells were drilled on farm land, bordering a small run, northeast of and adjacent to the land upon which were located the wells approved in 1902.

Since May, 1905, the water company has from time to time drilled more wells and has obtained control of 59.5 acres for water works purposes. Of this tract, thirteen acres are owned outright, while the remainder (known as the Peelle, Statler and Deakin farms), lying between Prairie Avenue and the C. & M. V. R. R., is controlled by the company; i. e., the company has complete and permanent water rights,

and by agreement with the land owners the construction of dwellings and vaults within 500 feet of any of the wells is prohibited. The company on its part concedes to the owners of the property the right to use a sufficient amount of water for domestic purposes and cattle watering.

The small creek above referred to, flows in a general way longitudinally through the center of the land which is owned and controlled by the company. The land slopes gently toward the creek and is either cultivated or used for pasturage. Over two of the wells are plac d hand-pumps for use in drawing water for cattle. As the packing of these pumps is in poor condition, there is danger of contaminating the wells when priming the pumps.

The nearest house to the wells is about 300 feet distant from well No. 1. There are no others within 500 feet of any of the wells. Within 200 feet of well No. 2, however, is a privy belonging to the pumping station. This may affect the quality of the water in well No. 2.

The exact formation penetrated by the walls is not definitely known. The water is obtained principally, however, from sand and gravel deposits located from ten to fifty feet below the overlying clay.

The wells are operated by compressed air which forces the water into a vitrified pipe conduit, through which it flows by gravity to a covered collecting and pump well, 18 feet in diameter and 45 feet deep. From this it is elevated into a standpipe holding 230,000 gallons. In the pumping station is also located the electric lighting machinery.

The distribution system has been practically installed. There are thirteen miles of mains, varying in size from four to ten inches. Two hundred and eighty-five services are now in place

The supply is being used by about 1,200 people, and a rough estimate of the daily consumption is 66,500 gallons. There is no way of obtaining accurate records of water consumption.

The quality of the supply, as shown by recent analyses, is satisfactory for domestic purposes. Well No. 2, however, shows some evidence of having been contaminated in the past, although the water has been purified before reaching the well. This contamination is very possibly caused by the privy at the pumping station, above mentioned. Some of the samples contained objectionable high numbers of bacteria, although no coli were present. This may have been due to the manner of collecting samples. It would be desirable to have monthly analyses made of the aggregate supply and also of well No. 2 for a period of one year.

August 19, 1907, the State Board of Health approved the water supply of the Wilmington Water and Light Company, and also the use for water works purposes of land owned and controlled by that company, bounded on the northwest by Prairie Avenue, on the southeast by the Cincinnati and Muskingum Valley Railroad, on the southwest by

Wall Street, and on the northeast by the Lewis farm (as shown on plan filed with the State Board of Health); provided that no house or source of contamination be located within 500 feet of any well.

In order that any possible deterioration in the quality of the water might be detected the Board advised that samples of the aggregate supply and also samples from well No. 2 be submitted to the State Board of Health for analysis at least once a month during the year.

REPORT ON PROPOSED WATER SUPPLY FOR WOOSTER.

On February 11, 1907, Mr. C. A. Weiser, president of the council of the city of Wooster, together with Mr. James P. Fisher, superintendent of water works, Mr. Steve Smith, member of the board of public service, and Mr. Patterson, clerk of the service board, presented rough plans for a proposed water supply with a report by the consulting engineers, Messrs. Chapin and Knowles. These were referred to the chief engineer and the following report was made:

Present Supply. The Wooster water works were first installed in 1875, the supply being obtained from a small stream known as Christmas Run, just north of the city. The run is impounded by a dam forming what is known as the Redick Reservoir. This reservoir is still used as a partial source of supply by the city, in spite of the fact that it receives the imperfectly purified sewage from the county children's home.

The second source of supply was derived from a well 47 feet deep and 32 feet in diameter, in the northeasterly part of the city, dug in 1881. This well extends through shale and clay into sandstone, from which the water is obtained. The water is pumped into Bloomington Reservoir from which it is distributed by gravity through the city. The quality of this water is much better than that from either of the other two sources and analysis has shown it to be safe, although ground water obtained in the vicinity of this well has been found to be polluted.

A third and intermittent source of supply is Apple Creek. Water is taken from this stream at a point near the southerly limits of the city. As a large portion of the city drains naturally into Apple Creek above the intake and as the entire watershed of the creek contains a large number of farm houses, the creek is entirely unfit for a public supply; furthermore, it is very turbid during a large part of the time.

Past Actions of the Board. In 1894 an investigation into a proposed supply was made by a special commission called the "Water Extension Commission." This commission recommended that the supply be derived from sand and gravel deposits in the valley of Killbuck Creek at a point about two miles west of the city. This source of supply was investigated and approved by the State Board of Health.

In October, 1897, plans providing for the use of water from Apple Creek, to be taken from an intake at the southerly edge of the city, were presented to the State Board of Health and disapproved. In spite of this disapproval, however, the city has installed the Apple Creek pumping station, above mentioned.

In June, 1906, the approval of the State Board of Health was asked of a scheme for deriving a water supply from wells 75 to 125 feet deep, driven into shale and sand-rock which underlie the city and located at the southerly edge of town near Spruce Street, in the immediate vicinity of the location now proposed for the new works. This source of supply was disapproved, a recent examination made by the Board having shown that the water was not of good quality nor the location of the wells a favorable one.

At several times during the last thirteen years the State Board of Health has called the attention of the city of Wooster to its bad water supply but no definite steps toward procuring a better supply, satisfactory to the State Board of Health, have ever been taken.

Proposed Plans. The proposed plans provide for building a new pumping station with new pumping machinery, upon land lying between Spruce Street and the Pennsylvania Railroad in the valley of Apple Creek at the southerly edge of the built-up portion of the city and a few hundred feet from this stream. It is proposed to use as a principal source of supply driven wells in the valley of Apple Creek, and in case these wells do not furnish enough water, it is proposed to draw directly from the creek at this point. Two of the wells which it is proposed to use were investigated by the State Board of Health in June, 1906, and their use as a source of supply disapproved.

The plans provide also for a mechanical filter plant in which it is proposed to filter the creek water and also, if necessary, the well water. The details of this filter plant are not shown.

The plans are accompanied by the verbal request of the president of council and the other officials above mentioned, that on account of lack of funds, the city be permitted by the State Board of Health to install at this time the pumping station, omitting the filters, and to use water from the Spruce Street wells, which were disapproved by the Board in June, 1906, together with water from more wells to be driven at a location immediately west of that occupied by the Spruce Street wells. It is also desired to construct an emergency intake into Apple Creek at Spruce Street. The officials stated that if the State Board of Health so required, they would be willing to agree that the water from wells or creek should not be used for domestic purposes, until after the installation of a filtration plant.

The location proposed for the new wells would in a measure be subject to the same objection, as to location, which applies to the Spruce Street wells. When financially in a position to do so, the officials state

that the filter plant will be added to the pumping station and that the well water, together with the creek water, if used, will be filtered.

In considering the scheme of using the water for fire and sprinkling purposes only (i. e., forbidding its use for domestic purposes), it should be borne in mind that, as the distribution system already extends into many dwellings in the city, it would probably be impracticable to restrict the use of the water in such manner. Furthermore, if the water supply of the city is to be so restricted, it would seem to be a more economical plan to continue to use the present intake into Apple Creek, making such improvements in the pumping machinery as are necessary.

To filter a clear cold ground water by mechanical filtration is, in the light of investigations made by this Board, considered impracticable. A slow sand filter would be much better adapted for this purpose but such a filter would also be much more expensive.

The proposed new intake into Apple Creek at the point near Spruce Street would be undesirable for the reason that Apple Creek will always receive, above the proposed location, the natural drainage, if not the sewage, from a portion of Wooster. The proposed plan contemplates extending the present sewers, which discharge into the creek, to a point below the proposed intake by means of an iron pipe in the bed of the stream. This scheme, if faithfully carried out, would protect the intake from sewage pollution from this source but there would always be the danger of the pipe breaking or the joints leaking, and it would be difficult to examine the pipe to determine whether it was at all times in good condition.

The Board took the following action upon these plans, March 4, 1907:

1st. The disapproval of the use of the Spruce Street wells so-called which had already been disapproved by the State Board of Health;

2nd. The disapproval of the scheme, proposed by the president of council and other city officials, of obtaining water from more wells to be located immediately west of Spruce Street;

3rd. The disapproval of the scheme, suggested by the president of council and other city officials, of filtering by mechanical filters the water derived from wells;

4th. The disapproval of the scheme, suggested by the president of council and other city officials, for constructing an emergency intake into Apple Creek near Spruce Street, unless a filtration plant, satisfactory to the State Board of Health, is first installed and operated whenever this Apple Creek water is used; and,

5th. The approval of the scheme, proposed by the consulting engineers, of obtaining a water supply from wells in the Killbuck Valley, provided the exact location of these wells be, in the opinion of the State Board of Health, at a safe distance from the city and the water from these wells be satisfactory in quality to said Board.

The Board also offered the following advice:

As the water of Apple Creek at the southerly edge of the city is more contaminated than the water of Killbuck Creek, it would be more desirable to arrange for using the water of the latter creek with filtration rather than the water of Apple Creek. The fact that it will be necessary to extend the present main sewer of the city through a pipe laid in the creek bed to a point below the proposed intake at Spruce Street, suggests the possible further contamination of Apple Creek, in case of breakage of or leakage from the pipe, and this further points to the advantage of using Killbuck Creek. The project, therefore, which would ultimately prove most satisfactory for Wooster would be to derive water from wells in the valley of Killbuck Creek, as recommended by the consulting engineers, at a safe distance from the city, and in case such water should at times prove insufficient, to use water from Killbuck Creek with a filtration plant. It would in this case be necessary to operate the filtration plant only when surface water was being used.

SEWERAGE AND SEWAGE PURIFICATION.

SEWERAGE FOR AKRON.

REPORT ON PROPOSED ENLARGEMENT AND EXTENSION OF THE MAIN SEWER.

On December 20, 1906, plans showing proposed extension and new outlet for the main sewer of Akron were submitted to the State Board of Health by the city engineer, Mr. J. W. Payne. January 11, 1907, the chief engineer visited Akron and inspected the location for the proposed work. The following report was made:

Present Conditions. Akron is a city in the northeasterly part of the state and at the present time has a population of about 50,000. It lies just north of the "Great Divide" and in the valley of the Little Cuyahoga River. The neighboring topography is rough and most of the city is built on hilly ground. The area within the corporation limits is 11.67 square miles, but much of this is not built up. There are approximately 35 miles of paved streets of all kinds.

The first sewers were built in 1880, and in accordance with a general plan worked out by O. N. Gardner, then city engineer. The system has been added to from time to time as requirements indicated. The area now tributary to sewers is about 7 square miles. The main business portion of the town is provided with combined sewers while all the outlying districts have the separate system. In 1900 a fire destroyed the city hall and with it nearly all the records and plans of the sewerage system so that information obtained for this report is by no means complete. New surveys and maps are now being made, but these will not be finished for several years. All but one of the sanitary sewers discharge into a 42-inch circular brick intercepting sewer which conducts the sewage to a point just at the northern edge of the thickly built up portion of the city a few hundred feet below Ravine Street, on the Little Cuyahoga River. The Howard Street main sewer, which is the only large combined sewer, is provided with a storm water overflow which permits practically all sewage over and above the extreme dry weather flow to discharge into the Little Cuyahoga at Howard Street half a mile above the outlet of the interceptor. The other sewer discharging into the river is an old sanitary 18-inch vitrified pipe sewer which runs very nearly full and has its outlet at about the same point but on the opposite side of the river from the interceptor. All sewers seem to be of ample capacity except the Howard Street combined sewer which is overtaxed during large storms. Many of the local combined sewers are made too large and are laid on too slight a grade so that they occasionally clog up. Many of the laterals, especially those built by private parties, have joints without jute gaskets and are rough on the inside, thus causing stoppages.

No accurate measurements of the flow of sewage have been made,

but it is estimated that the total flow of the city is in the neighborhood of 5,000,000 gallons per day.

There are several large rubber factories and also a few smaller manufacturing establishments which are connected with the sewers. The sewage is probably not, however, complicated by manufacturing wastes to such an extent as to interfere with its treatment in purification works.

Proposed Plans. It is proposed to enlarge the present 42-inch combined main sewer which now discharges into the Little Cuyahoga River in part at Howard Street and in part half a mile farther down stream, as described above. Beginning at Howard Street it is proposed to build 1,125 feet of circular brick sewer 6 feet in diameter, and 1,675 feet of a large reinforced concrete rectangular sewer 7.5 feet wide and 4 feet high, containing in its bottom a semi-circular channel 42 inches in diameter to carry the dry weather sewage flow. The proposed outlet for this large new sewer is into the Little Cuyahoga River at a point 900 feet below the present lower outlet and a few hundred feet below Ravine Street. The entire flow of the present main sewer as well as that of the 18-inch sewer on the northeasterly side of the river will be discharged at the new outlet.

The plan as proposed will by no means satisfactorily solve the problem of properly disposing of the sewage of Akron. The construction of such a sewer would simply transfer the nuisance farther down stream, and while fewer people would be offended by it, the Little Cuyahoga River would still be practically an open sewer. It would seem that the money which it is proposed to expend on this large combined sewer could be spent to much better advantage in separating the storm sewage from the domestic sewage in such parts of the city where combined sewers are now in use, and in constructing a main sewer for domestic sewage only, down stream to suitable sewage purification works, and there purify the sewage.

The State Board of Health considered these plans, as shown on drawings submitted December 20, 1906, by the city engineer, and the same were disapproved.

The Board advised that instead of building the large combined sewer as proposed, the city take steps toward separating the domestic sewage from the storm sewage in such parts of the city as is necessary; and build a trunk sewer for domestic sewage only, such sewer to discharge into the river at a point suitable for purification works until such time as arrangements can be made for purifying the sewage. Surface drainage can then be allowed, without offense, to discharge into the river where most convenient, thus relieving the domestic sewers.

REPORT ON PROPOSED SEWER FOR CUYAHOGA STREET DISTRICT IN THE EXTREME NORTHEASTERLY PORTION OF AKRON.

December 20, 1906, the city engineer of Akron, Mr. J. W. Payne, also submitted plans for proposed sewer for Cuyahoga Street District in the extreme northeasterly portion of Akron. After his inspection of the territory January 11, 1907, the chief engineer reported as follows:

The district in question at present consists of but one street, 2,000 feet long, terminating at the northerly corporation line. There are at present 52 houses on this street. The district will probably never be very thickly populated.

The proposed sewer will be from 8 inches to 12 inches in diameter and it is proposed to discharge it into the Little Cuyahoga River about 3,700 feet from the junction of this stream with the Big Cuyahoga River.

The total length of the sewer is to be 3,000 feet and it will be used for domestic sewage only.

These plans, submitted by the city engineer on December 20, 1906, were considered by the State Board of Health at a meeting held January 23, 1907, and were approved provided that the main sewer for this district be constructed at such an elevation that it can, when necessary, be continued in a southerly direction and discharged into the city sewer system, or at sewage purification works.

REPORT ON PROPOSED SEWER FOR MAYFIELD ALLOTMENT AND PORTAGE PARK ADDITION, AKRON.

December 20, 1906, Mr. J. W. Payne, city engineer of Akron, submitted plans for proposed sewer for Mayfield Allotment and Portage Park Addition, Akron. The chief engineer of the Board visited Akron January 11, 1907, inspected the territory in question and the following report was made:

Mayfield Allotment and Portage Park Addition is a tract of land in the extreme northwesterly corner of the city of Akron, covering 350 to 400 acres. This area is so situated that it cannot drain by gravity into the sewer system of Akron. It is, therefore, necessary to discharge sewage from this area into a small stream leading southward to the Tuscarawas River. This stream is already used, at a point just outside the corporation limits, by the county infirmary for discharging its sewage unpurified. One other storm sewer discharges into the stream at Exchange Street. This storm sewer receives domestic sewage from about one dozen houses, and consequently pollutes the stream as does also the county infirmary.

The proposed sewer will be located principally in West Market Street. It will consist of tile pipe, 8, 10, and 12 inches in diameter, and it is proposed to discharge it into this same stream a short distance below the present outlet of the county infirmary sewer. The sewer on com-

pletion of its construction will be used by about twenty-five families. From the nature of the Allotment, it is expected that there will never be more than 200 families accessible to the sewer.

The plans for this proposed sewer were approved by the State Board of Helath on January 23, 1907, provided that a sewage purification plant, of a design satisfactory to the Board, be constructed and that all the sewage from the proposed sewer be purified at such plant before being discharged into the stream; or that the sewage be pumped into the city's general sewer system.

SEWAGE PURIFICATION FOR MAYFIELD ALLOTMENT AND PORTAGE PARK ADDITION, AKRON.

March 11, 1907, Mr. J. W. Payne, city engineer, submitted a plan for a proposed sewage purification plant for Mayfield Allotment and Portage Park Addition. The chief engineer reported upon these as follows:

The method of proposed sewage purification consists of intermittent filtration through sand and gravel, or possibly through fine coke or cinders. The plant is to be located on land owned by the county infirmary, a few hundred feet west of West Exchange Street.

The sewage entering the works will be received in a dosing chamber 15 feet square and 4 feet deep, holding 3,500 gallons. The contents of this chamber will be discharged upon the filters through an automatic siphon.

The filters are two in number, each 75 feet square, thus making a total area of about one-fourth acre. The sewage will be distributed over the surface by means of wooden troughs with concrete bottoms.

At present there are not more than twenty families connected with the sewers, and it is expected that there will never be more than 200 families connected. The plant therefore will be adequate for some time in the future.

The effluent is to be discharged into a small stream which flows through farm lands for several miles below the plant, finally entering the Tuscarawas River.

The Board approved this plan, March 13, 1907, provided:

1st. That samples of the filtering material be submitted to and receive the approval of the State Board of Health before being placed;

2nd. That detailed plans, showing the arrangement of the dosing apparatus, be submitted to and receive the approval of the State Board of Health before the plant is built;

3rd. That detailed plans, showing longitudinal section through the underdrains, be submitted to the State Board of Health before the plant is built;

4th. That a screen chamber containing a screen with open space

of about one-half inch, be placed at the entrance to the dosing tank, and that plans for such screen chamber and screen be submitted to the State Board of Health for approval before the plant is built;

5th. That the plant be placed at least 800 feet from the county infirmary and 400 feet from the highway; and,

6th. That the management and operation of the plant be at all times satisfactory to the State Board of Health, and that the plan be enlarged when, in the opinion of the State Board of Health, this becomes necessary.

REPORT ON PROPOSED SEWER OUTLET FOR BYESVILLE.

At the meeting of the State Board of Health held January 23, 1907, Dr. C. L. Austin, representing the citizens of Byesville, appeared before the Board and asked its approval of the suggested scheme of installing a sewerage system and discharging the sewage into Wills Creek, unpurified. The matter was referred to a committee, consisting of the member of the Board from that district and the chief engineer. The committee visited Byesville on Februnary 28, 1907, and the following report was made:

The sanitary condition of Byesville was investigated by the chief engineer on November 13, and the assistant engineer on December 22, 1905, and a report was made entitled "Report on the Pollution of a Ditch at Byesville," which was printed in the 1906 annual report of the Board. The fourth conclusion of this report, which was sent to the local officials when made, suggests the desirability for proper sewerage and sewage purification.

The inspection by the committee on February 28, 1907, showed that the sanitary conditions, as regards the pollution of the ditch, were practically the same as described in the report. The ditch was acknowledged by all the citizens who were interviewed to be a disgrace to the village. There appears to be little typhoid fever, however, at the present time.

A large number of citizens and members of council of Byesville, realizing that the sanitary condition of the village should be improved, desire to construct a sewerage system, and further desire the State Board of Health to approve of discharging from this system, in an unpurified state, into Wills Creek. They object to building purification works on account of the extra cost. No definite plans, surveys or estimates of cost of the system, or of a purification plant, have been made.

On account of the fact that the city of Cambridge, at a point six or eight miles below Byesville, uses Wills Creek as a source of water supply, it would be a distinct danger to the city of Cambridge to allow Byesville to discharge unpurified sewage into the creek. Although the

citizens of Cambridge are agitating the subject of an improved water supply from a source other than Wills Creek, such project has as yet taken no definite shape. Even if the water supply intake of Cambridge into Wills Creek were abandoned, it would be undesirable to have the creek polluted with sewage as it passes through the city of Cambridge.

The inspection of the ground at Byesville showed that there is an excellent location for sewage purification works near the point where the main sewer outlet for the village would probably be. Though no surveys have been made, it seems probable that a plant at this location could be operated by gravity.

The Board, on March 8, 1907, disapproved this proposed scheme for discharging the sewage from Byesville in an unpurified state into Wills Creek, and advised the authorities to engage the services of an engineer experienced in matters relating to sewerage and sewage purification, and have him make surveys, plans and estimates, and then submit these to the State Board of Health for criticism and approval.

REPORT ON PROPOSED AMENDMENT TO SEWERAGE PLANS FOR THE SOUTHWESTERLY DISTRICT OF CAMBRIDGE.

At a meeting of the State Board of Health held January 23, 1907, the mayor, member of the board of public service, and city engineer of Cambridge, appeared before the Board to request approval of a proposed amendment to sewerage plans for the southwesterly district of Cambridge, which plans had been previously approved. A plan showing this proposed amendment was submitted. February 28, 1907, the member and the chief engineer of the Board, as a committee, visited Cambridge, and the following report was made:

The mayor of Cambridge, February 12, 1906, submitted an application for approval of a new sewer in the southwesterly portion of the city. After investigation, approval of the proposed scheme was given by the State Board of Health, March 1, 1906, upon the following conditions:

1st. That the proposed sewer be constructed at such elevation that the sewage can be easily passed through purification works before discharging into the stream when it becomes necessary to construct such works; and,

2nd. That sewage purification works, satisfactory to the State Board of Health, be constructed whenever in the opinion of said Board such works become necessary.

necessary."

The report on the proposed scheme is printed in the 1906 annual report.

The plan as approved has never been carried out, although the necessity for sewerage in the southwesterly district is great. The city officials now wish to amend the plans by locating the outlet of the proposed sewer at a point some 2,000 feet above the location originally intended for the outlet and 500 or 600 feet above the B. and O. Railroad bridge. This amendment is desired for the purpose of saving expense, as, in order to follow the original plans, it would be necessary to lay the sewer in several hundred feet of rock cut. The estimated amount which would be saved by the proposed amendment is about $5,000.

The amended plans call for discharging the sewer into the upper end of a backwater caused by a dam near the sheet mill. There is practically no current at the proposed outlet, although the water is fairly deep. Within one-quarter of a mile of that portion of the river which extends for 1000 feet immediately below the proposed outlet, are probably twenty-five houses; and a highway bridge over which there is much travel, crosses the stream about 800 feet below the proposed outlet. It is possible that the sewage could be discharged into this slack-water, without offense, during the colder months, but with the coming of warm weather the accumulated deposits as well as the sewage continuing to enter the river would probably putrefy and give off foul odors. Then the fact that floating particles of sewage would lodge along the banks of the stream at all times is an objectionable feature.

March 8, 1907, the Board disapproved this proposed amendment to sewerage plans for the southwesterly district of Cambridge, which amendment called for the locating of the outlet of the main sewer about 2,000 feet above the location already approved by the State Board of Health.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR CHAGRIN FALLS.

Plans for proposed sewerage and sewage purification for Chagrin Falls were received on July 19, 1907, from The Walter P. Rice Engineering Company of Cleveland, consulting engineers. In anticipation of these plans being submitted, Chagrin Falls was visited by the chief engineer on April 10, 1907. The following report was made:

Chagrin Falls is a village of about 1800 population, located in Cuyahoga County on the Chagrin River. There are at present no sewers in the town, except a few private drains leading into the river. The village is supplied with a public water supply derived from springs two and one-half miles east of the village.

The present water consumption is about 65 gallons per capita. It is

estimated, therefore, that with 1,500 persons using the sewers, the daily flow will be about 97,000 gallons; and with 2,000 persons using the sewers (which will probably not be the case for many years), the daily output of sewage will be 130,000 gallons. The sewage purification plant has been designed upon the above basis.

The Chagrin River below Chagrin Falls is not used by any municipality as a source of public water supply. The stream passes through rather hilly farming country for twenty miles before reaching the lake.

The method proposed for sewage purification is treatment in septic tanks, contact filters and sand filters. About seven acres of land located in the southwesterly corner of the corporation between Solon Road and the Chagrin River, are to be purchased for sewage purification purposes. On this tract of land are one house and two barns, which will be included in the property purchased. The next nearest houses are at a safe distance from the plant.

The septic tanks are two in number, each 75 feet long and 9 feet 9 inches wide, with an average depth of 6 feet, 9 inches. The combined capacity of the tanks is 66,700 gallons, or about twelve hours' flow when the plant has reached its capacity. Either one or both tanks can be used.

The sewage first enters a shallow screen chamber from which it passes through screens into the septic tanks. The tanks are to be covered with a wooden roof well provided with manholes. An area is to be prepared to receive the sludge when it is necessary to clean the tanks.

The contact filters are four in number, each 60x30 feet, containing about four feet of filtering material consisting of coarse material graded. With the plant working at its normal capacity, these filters will operate at a rate of about three cycles per day. This rate would be high were it not for the fact that the effluent is to be further treated on sand.

The contact filters are to be controlled by the Merritt air-lock system, a patented device which is said to have given satisfaction. The proper operation of this device is guaranteed by the manufacturers. The apparatus will be so arranged that the effluent from any of the contact filters may be directed to any one of the sand filters.

The sand filters are four in number, each 100x43 feet, thus making a total area of 0.4 acre. Two filters only are to be constructed in the immediate future. The filters are to contain four and one-half feet of washed creek sand underlaid by gravel, with very coarse gravel around the drains. The sand, according to the samples submitted, will have an effective size of 0.20 m. m. and a uniformly co-efficient of 1.9. The filters will be operated, when the plant has reached full capacity, at a rate of about 330,000 gallons per acre per day.

The sewage is to be distributed upon the sand filters by means of wooden troughs. There are three rows of underdrains consisting of 6-inch pipe laid twelve feet apart.

The sand filters as well as the rest of the plant are to be placed on ground which is above high water in the creek.

At a meeting, held August 30, 1907, the State Board of Health approved the plans for sewerage and sewage purification for Chagrin Falls, as shown on drawings submitted by The Walter P. Rice Engineering Company of Cleveland, July 19, 1907, provided:

1st. That the operation of the plant be at all times satisfactory to the State Board of Health;

2nd. That samples of the filtering material for the contact filters be submitted to and receive the approval of the State Board of Health before this material is used; and,

3rd. That the plant be enlarged in a manner satisfactory to the State Board of Health when the number of persons contributing sewage to the plant reaches 2,000; such enlargement being necessary at that time, in the opinion of the said Board.

REPORT ON PROPOSED SEWAGE PURIFICATION PLANT FOR THE CRAWFORD COUNTY INFIRMARY NEAR BUCYRUS.

On April 16, 1907, plans and specifications for a proposed sewage purification plant for the Crawford County Infirmary were submitted by Messrs. E. G. Bradbury and George P. Shute, of Columbus, consulting engineers for the infirmary. These plans were referred to the chief engineer and the following report was made:

The Crawford County Infirmary is located about three miles southeast of the city of Bucyrus, upon the upper end of the watershed of the Olentangy River. A small stream of intermittent character flows near the institution and enters Whetstone Creek, a tributary of the Olentangy. The topography of this country is quite flat.

The estimated capacity of the institution is about one hundred persons. There are seventy inmates at present. A water supply for the infirmary is derived from a well on the grounds and is ample for all present needs. On account of the absence of modern plumbing, the water consumption is small at the present time. When a modern plumbing system is installed, however, it is estimated that the flow of sewage will vary between 2,100 and 5,000 gallons per day.

The method proposed for sewage purification is simple intermittent sand filtration, and the sewage is to be applied, while fresh, without any preliminary treatment except a rough screening.

The sewage will be collected in a dosing tank near the buildings, from which it will be flushed intermittently through an 8-inch sewer to the filters which are located some 1,500 feet distant. At the dosing tank is a covered screen chamber containing a screen having an open

space of one inch. This will be cleaned daily. The total capacity of the dosing tank is 1,680 gallons, which is sufficient to flood a single filter to a depth of three inches.

The sand filters, which will be composed of lake sand, are three in number and have a total area of one-fifteenth of an acre. Each is triangular in shape. The depth of filtering material will be three feet, including a bottom layer of four to six inches of graded gravel. The bottoms of the filters are to be shaped into ridges and valleys, the 4-inch underdrains being placed in the valleys. The filters will be divided by earth embankments about one foot high. Distribution will be effected by simple sluice gates opening into a wooden trough which leads to the middle of each filter. The bottoms of the filters are five feet above the ordinary stage of the creek, and the maximum flood level will not enter the filtering material.

Based on a flow of 5,000 gallons per day, the filters will be operated at a rate of 75,000 gallons per acre per day. This will probably be the maximum rate.

At its meeting held April 24, 1907, the State Board of Health approved these plans for a sewage purification plant for the Crawford County Infirmary provided the method of operation of the plant be at all times satisfactory to the State Board of Health.

REPORT ON PROPOSED SEWERAGE FOR A PORTION OF DISTRICT NO. 5, DAYTON.

Plans for sewerage for a portion of District No. 5, Dayton, were received from Mr. F. O. Eichelberger, assistant city engineer, on June 21, 1907. The chief engineer visited Dayton on June 25, 1907, and made an investigation of the proposed scheme. The following report was submitted:

The city of Dayton has a population of about 110,000. It is provided with a fairly complete system of sewers. With a few exceptions these sewers are on the separate system. There are now about 110 miles of domestic sewers built, or under contract, while twelve more miles are proposed. This will give eighty or ninety per cent. of the population access to the sewers.

The present sewers discharge into the Great Miami River at three different points. The principal outlet is on the easterly side of the river near the Fair Grounds, just one mile south of the center of the city and near the foot of Longworth Street. This is a 42-inch sewer. Nearly opposite this outlet is a 15-inch sewer in St. Francis Avenue. About one and one-half miles below these outlets, at the foot of Broadway, is a 48-inch combined sewer with a separate 12-inch iron pipe outlet for

the dry weather flow. These two latter sewers were approved by the State Board of Health in 1902. The Longworth Street outlet and the St. Francis Avenue outlet are provided with pumping stations which are used to pump the sewage into the river during flood stages. The Broadway sewer has been built of a larger diameter than called for under the plans approved in 1902; and it is being used as a combined sewer instead of as a domestic sewer, as was the understanding at the time of approval.

The plan now proposed provides for sewering an area of 1,024 acres, which comprises part of Sewer District No. 5. In addition to this, the proposed sewers will receive the drainage from 1,000 feet of sewers already laid in the "Shantz Addition," but which as yet have no outlet. It is proposed, for immediate construction, to build 400 feet of 18-inch sewers, 175 feet of 12-inch sewers, 1,325 feet of 10-inch sewers, and 13,800 feet of 8-inch sewers. The outlet is to be into the Great Miami River at a point about 1,700 feet west of the corner of Main and Caldwell streets and 3,000 feet down stream from the present principal outlet, above mentioned, near Longworth Street.

The present population of District No. 5 is 1,500. It is estimated that the ultimate population will be 15,000. It is expected that the flow of sewage in the near future will be 120,000 gallons per day. The sewers are designed to carry 1,500,000 gallons. The sewers are all built upon fairly steep grades, and the plans in this respect are satisfactory.

The elevation of the main sewer is such that when the city of Dayton constructs sewage purification works, the sewage of this district can be drained by gravity into the present Longworth Street pumping station. Or, if the location of this pumping station should be changed to a point farther down the stream, the District No. 5 sewer will be high enough to enter a future intercepting sewer.

July 1, 1907, the Board approved these plans for sewerage, including a new outlet, for a portion of District No. 5, as shown on drawings submitted by F. O. Eichelberger on June 21, 1907, provided the outlet of the sewer be so constructed that the sewage will be discharged, by means of an iron pipe, below the low water level of the river at all times.

REPORT ON PROPOSED SEWERAGE PURIFICATION FOR THE GIRLS' INDUSTRIAL HOME, AT DELAWARE.

Plans for proposed sewage purification for the Girls' Industrial Home, Delaware, were submitted on July 8, 1907, by Messrs. E. G. Bradbury and George P. Shute, of Columbus, engineers for the institution, following the instructions of Mr. Frank C. Hubbard, chairman of the sewerage committee of the board of trustees of the Home. These plans

were referred to the chief engineer of the Board, and the following report was made:

The Girls' Industrial Home is located on the Scioto River about sixteen miles, by water, above the intake of the Columbus water supply. The institution has at present a population of about 500 including both pupils and teachers. When certain buildings now under construction are completed accommodations will be provided for 600 or more persons.

The institution is built on the cottage plan, there being nine residential buildings, one school house, one hospital and one administration building. These buildings are all connected with the sewerage system. The farmers' and laborers' houses are some distance from the institution buildings and are not connected with the sewers.

The Home obtains its water supply from the Scioto River opposite the upper portion of the grounds. Water for drinking and cooking purposes is said to be carried in pails from a deep flowing well near the river bank. The estimated daily consumption at the present time is 30,000 gallons, or 60 gallons per capita.

The sewage from the institution, which approximates in quantity the water consumption, is discharged directly into the Scioto River. The discharge of the sewage in its crude state has been a source of complaint for some years, not only because of the danger to the Columbus water supply but also for the reason that the Home itself and the landholders below on the river are subjected to the discomforts and dangers of a polluted stream.

PROPOSED PLANS.

The proposed plans for the sewage disposal are designed to purify 100,000 gallons per day, or the sewage of at least 1,000 persons, an increased yield per capita being expected when certain improvements now contemplated in the plumbing of the institution are completed.

The plans provide for building a 10-inch trunk sewer, having a grade of 0.25 per cent., to intercept the present sewers discharging into the river and convey the sewage to a site for purification works immediately north of the southerly limit of the state property. The length of this intercepting sewer will be 2,690 feet. As most of the down-spouts from the buildings are connected with the present sewers, it is proposed, as a part of the improvement, to cut out all but one of the down-spouts and provide for disposing of the rain water by other means. This will prevent the overworking and flooding of the sewage purification works during times of rain, and will also prevent the necessity for by-passing, at any time, a mixture of rain water and sewage.

Method of Purification. The method proposed for sewage purification is septic tank treatment followed by oxidation in sprinkling filters and sedimentation to remove the oxidized suspended matter, filtration through sand, and final disinfection of the effluent by means of chemicals.

The purification works are to be located on a steep hillside and there is available some forty feet of fall between the main sewer and the high water mark of the river. This will permit placing the works where they will not be interfered with by freshets and at the same time provide for sufficient fall between the various portions.

Screen Chamber. The sewage on arriving at the works first enters an open screen chamber, 2 feet 9 inches by 3 feet 10 inches, adjoining the septic tanks and containing an iron screen having a ¾-inch mesh. The coarsest material in the sewage will here be removed by raking the screens, and this material will be disposed of by burning or burying.

Septic Tanks. The sewage next passes to the septic tanks. These are three in number; all have a length of 20 feet and an average depth of 8 feet. The center tank is 12 feet wide and has a capacity of 14,300 gallons; the northerly tank is 9 feet wide, with a capacity of 10,800 gallons; while the southerly tank is 7 feet wide and has a capacity of 8,400 gallons. The total capacity of the septic tanks is 33,500 gallons, or about eight hours' flow when the plant has reached its nominal capacity. The sewage is directed to or diverted from any tank by an adjustable weir. This elastic design of the tanks makes it possible to secure approximately any septic period desired. The tanks are to be covered with a 6-inch concrete roof. They have four different outlets, each leading to a section of the sprinkling filters.

The bottoms of the tanks are sloped sharply toward the lower end and provision is made for draining the sludge, when necessary, to a sludge bed, 34 feet by 21 feet, filled with two feet of sand and crushed stone. The liquid passing through this bed will be further purified in the sand filters.

Sprinkling Filters. The total area of these filters is 0.067 acre, divided into four equal sections each with its separate supply pipe from the septic tanks. They are to contain six and one-half feet of broken stone. Owing to the topography of the ground and difficult rock excavation, the sections are placed in the form of terraces. The available head for sprinkling, on account of this arrangement, varies from eight to seventeen feet. The outside walls of the sprinkling filters are to be constructed of rough stone masonry, as is the English practice. There will be seven lines of 3-inch underdrains crossing the entire area of filters at an angle of 45 degrees to the sides. These discharge into a 10-inch pipe leading to the sedimentation basin. The sewage is to be applied to the filters through a system of 4-inch distributing pipes having 3-inch risers and sprinkling nozzles every twelve feet. With the plant working at nominal capacity, the sewage will be applied to the filters at the rate of 1,500,000 gallons per acre per day, or of 3,000 persons per acre-foot.

Settling Basins. The sprinkling filter effluent is to pass continuously into one or both of two settling basins, each of which has a capacity

of 9,200 gallons. The velocity of flow through these tanks is about twenty-two feet per hour.

Provision is made for drawing off the sludge from the bottom of these settling basins on to the same sludge bed which is to be used for receiving the sludge from the septic tanks. The sludge bed is located adjacent to the settling basins and dosing tank.

Dosing Tank. Located between the settling basins is the dosing tank which is 18 by 12 by 3.5 and holds 5,675 gallons. This dosing tank is to contain four 8-inch cast iron siphons, each of which will drain the tank when it is full and so connected that they will discharge in rotation.

Sand Filters. The settled sprinkling filter effluent will be discharged through the dosing tank, as above described, on to the sand filters. These are eight in number, each 52 feet square, and have a total area of 0.5 acre. This represents a rate of filtration, when the plant has reached its capacity, of 100,000 gallons or 200,000 gallons per acre per day, or 2,000 persons per acre. This is very liberal in view of the fact that the sewage will have been so thoroughly treated before being applied to these filters.

Each of the four siphons in the dosing tank is connected with a group of two of the filters; and the sewage can be diverted from one to the other in each group by means of gates. The filters will contain two and one-half feet of lake sand, or equal, underlaid by four to eight inches of gravel. The upper four filters are drained through 6-inch lateral underdrains into one main 8-inch underdrain; and the lower four are similarly drained into another 8-inch drain.

Disinfection Chamber. For the purpose of eliminating from the purified sewage any dangerous organisms which may not be removed by the different processes above described, there will be established near the lower edge of the sand filters, according to the plans, a disinfection or treatment chamber. This chamber is 13 feet, 3 inches long by 3 feet, 8 inches wide, and is built entirely of concrete, including the roof. It contains a solution tank having a capacity of 500 gallons, in which the disinfecting chemical may be mixed with a portion of the sewage effluent, which can be diverted from the main drain for this purpose. The flow from this solution tank is controlled by a small orifice tank, the outlet pipe of which is so connected, by a simple mechanism, with a float in the main underdrain that the amount of disinfectant used will be proportionate to the flow of the sewage effluent.

Disinfection Basin. After the sewage has been treated in the disinfection chamber, as above described, it is to flow through a basin holding 8,300 gallons, or two hours flow based on a 100,000 gallon capacity for the plant. This basin is for the purpose of allowing opportunity for the disinfecting chemical to thoroughly react with the sewage effluent before it is discharged into the river.

Cost. The estimated cost of the plant is $14,164.88, of which

$5,735.30 is the estimated cost of the sand filters and about $2,000.00 the cost of the main sewer. This cost is well within the appropriation of $15,000.00 and it is expected that the balance will be used in cutting out the roof water from the present sewers.

Efficiency. The plant as designed is undoubtedly capable of purifying in a most efficient manner the sewage not only of the present population of the institution, but also the sewage which will be discharged when the population has reached 1,000 or more. The plans have been drawn up substantially in accordance with the suggestions which were given to the designing engineers by the State Board of Health.

July 15, 1907, the Board approved these plans, submitted by Messrs. Bradbury and Shute, July 8, 1907, upon the following conditions:

1st. That the operation of the plant, including the character and amounts of chemicals to be used, be at all times satisfactory to the State Board of Health;

2nd. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being placed; and,

3rd. That detail drawings of the automatic discharging devices in the dosing tank and of the sprinkling nozzles be submitted to and receive the approval of the State Board of Health.

The attention of the board of trustees was also called to the importance of providing for disconnecting from the sewers the down spouts from the roofs of the various buildings, in order that the plant be not overworked at times of rain.

August 1, 1907, Messrs. Bradbury and Shute, submitted plans showing details of various automatic devices to be used in connection with the proposed sewage purification plant. The chief engineer reported that the plans showed details of air valve for controlling automatic siphonic apparatus which is to control the distribution of the sewage on to the sand filters; the float to regulate the flow from the septic tanks to the sprinkling filters; the details of chemical feed device; details of sprinklers, screen, manholes, and manhole covers. These plans being submitted in accordance with Condition No. 3 of the approval of the plans for the proposed sewage purification plant, given July 15, 1907, the Board approved the same August 23, 1907.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR EATON.

On April 10, 20 and 24, 1907, there were submitted by Mr. A. L. Reid, city engineer of Eaton, and The Riggs and Sherman Company, consulting engineers, plans for sewerage and sewage purification for that

village. The chief engineer visited Eaton on April 17, 1907, to make the necessary inspection. The plans were examined by him and the following report was submitted:

Eaton is a village of about 4,000 population and has an area of about two square miles. It is located in Preble County on the upper end of the watershed of the Great Miami River. A small stream called Seven Mile Creek passes by the edge of the village and receives a considerable amount of objectionable pollution through the present storm water drains. The proposed plans provide for a complete system of domestic sewerage as well as storm sewerage.

The domestic system when completed will have a total length of nearly fifteen miles. The sewers will range from six to fifteen inches in size. It is not considered necessary to underdrain the sewers as most of the land in the village is quite dry. They will be ventilated in the usual manner through perforated covers and untrapped soil pipes. Flush tanks will be provided at all dead ends.

The storm sewers will have a total length of six and one-half miles and will range from twelve to forty-two inches in diameter. There will be six outlets, discharging into Seven Mile Creek on the westerly side of the village and into Rocky Run branch on the easterly side.

The domestic sewage from the village will be collected through a 15-inch sewer and conveyed to the sewage purification works located approximately half a mile south of the corporation line on land bordering Seven Mile Creek, into which the purified sewage will be discharged. This site is exceptionally well located with reference to distance from habitation, the nearest house being 1,400 feet away. In addition, the plant will be obscured from sight from the highway by a steep hillside. The land available for sewage purification works covers about twenty acres. The village proposes to purchase at least seven acres. It would be desirable, however, if more land than this could be acquired, in order to protect the adoining land owners as well as for future extension of the plant.

It is estimated that within six years after building the first sewers, about 2,000 people will be connected. At 80 gallons per capita, the yield will be 160,000 gallons per day. Very little ground water is expected to enter the sewers, and there are no manufacturing wastes.

The method of purification proposed is septic tank treatment followed by intermittent sand filtration. A sand and gravel bank immediately adjoining the proposed site will furnish very excellent material for sand filtration, as shown by analysis made by the State Board of Health.

The sewage on arriving at the plant will first enter a "grate" chamber built adjacent to the upper end of the septic tanks. The grate through which the sewage is passed is to have an open space of ¾ inch.

The septic tanks are two in number, each 10 feet wide and 60 feet

long with an average depth of $7\frac{1}{2}$ feet. The total tank capacity is 63,000 gallons, which, based on a daily flow of 160,000 gallons, is equal to about nine and one-half hours' storage. The tanks are to be covered with a reinforced concrete roof provided with perforated manholes at every ten feet in order to prevent the accumulation of gases in the tops of the tanks and also to afford ready access to them. The sewage from the grate chamber is admitted into each of the two tanks through two 12-inch openings at the upper end, about two feet below the surface, and is drawn off through a single opening near the surface at the lower end of each tank. Baffles are placed two feet from the inlets and outlets.

The bottom of each tank is sloped toward the middle and center, at which point there is an opening to allow for drawing off the sludge. The plans provide for draining the sludge into a well from which it is to be pumped to a sludge bed having an area of 2,500 square feet. It appears on inspecting the plans, however, that the necessity for pumping the sludge might be overcome by locating the sludge bed at a sufficiently low elevation and protecting it from flood waters of the creek.

The septic tank effluent is to be conveyed through a 15-inch pipe into a dosing chamber holding about 10,000 gallons, which is sufficient to flood one of the sand filters to a depth of about three inches. The dosing chamber will be discharged automatically by apparatus, the type of which will not be decided upon until bids are received from various manufacturers.

The filters are six in number, each having an area at mid-depth of one-eighth acre. The filtering material proposed is one foot of sand underlaid by one foot of fine gravel, and this underlaid by another foot of coarser gravel. The bottoms of the filters are flat. The sewage is to be distributed over the surface of the filters by galvanized iron troughs of varying sizes, and the filters will be underdrained by four lines of 6-inch vitrified pipe spaced fifteen feet apart. The underdrains from the various filters enter one main 18-inch drain leading to Seven Mile Creek.

As there is suitable sand and gravel in plentiful quantities nearby, there appears to be no reason why the filters cannot be composed entirely of sand (except a thin layer of gravel at the bottom), instead of using only one foot of sand. Furthermore, the area proposed, in the light of investigations of the State Board of Health and as shown by experience at many places outside of Ohio, is insufficient to properly treat the flow of sewage for which the plant is designed.

As the necessary amount of money for building the plant has not yet been appropriated, there seems to be no reason why ample provision for at least six years in the future should not be made at the time of the first installation. The city engineer expresses a desire that the plans meet with the full approval of the State Board of Health in every respect.

These plans were approved by the Board on April 24, 1907, provided:

1st. That the sand filters be enlarged to an area of one and one-half acres for the first installation, and that plans showing this enlargement be submitted to and receive the approval of the State Board of Health:

2nd. That a further increase in the area be made when the average flow of sewage reaches 160,000 gallons per day (which flow is estimated to represent a population of 2,000 people using the sewers), if the State Board of Health at that time deems such enlargement necessary.

3rd. That detailed drawings of the automatic dosing apparatus be submitted to and receive the approval of the State Board of Health before installation.

4th. That samples of the filtering material, or specifications therefor, be submitted to the State Board of Health before being placed in the filters, and that the specified thickness of each grade of material meet the approval of the State Board of Health, when the quality is passed upon; and,

5th. That the operation of the purification plant be at all times satisfactory to the State Board of Health.

The Board suggested that the method of sludge disposal be so amended, by locating a shallow sludge bed at the necessary elevation and protecting it from flood waters of the creek, that it will be possible to handle the sludge by gravity and thus save the pumping apparatus.

The Board further suggested that a weir chamber be constructed in the line of the sewer above the plant so that the sewage may be readily gaged when desired; and they were advised that plans for this chamber should be approved by the State Board of Health.

At a meeting of the State Board of Health, held June 12, 1907, the following communication from the council of Eaton was read:

"*Be it resolved,* by the council of the village of Eaton, Ohio, that

WHEREAS, On the 22nd day of April, 1907, this council passed a resolution that the plans and specifications prepared by A. L. Reid and The Riggs and Sherman Company, civil engineers, for a proposed system of storm and sanitary sewerage and filtration disposal plant incident to such system, should all be submitted to the State Board of Health, and

WHEREAS, On the 29th day of April, 1907, said State Board of Health, did report to this council a qualified approval of said plans and specifications, making five qualifications, modifications or conditions, fully set out in said approval;

WHEREAS, This council is satisfied with the last three (number three, four and five) of said qualifications, but is of the opinion that the filtration area required by condition number one, and that the amount of the use of water estimated by condition number two, are probably correct for the proper operation of said system of sewerage in future years, yet larger than will be required during the first five years of the said operation, and that during the said five years the number of users of the sanitary sewerage will not be over twelve hundred and the use of the water will not be over a daily consumption of one hundred thousand gallons, and that in view of such primary requirements a filtration area of not more than one acre will amply answer during the said first five years;

THEREFORE, It is proposed and promised by this council that if the said State Board of Health will consent to a filtration area of not more than one acre for the initial construction, that at the end of five years from and after the beginning of the use of such filtration area if the said area is not ample in the opinion of the State Board of Health, then upon request or order of said Board the said filtration area will be enlarged to ample area to render proper results.

It is directed that a certified copy of this resolution be submitted to the State Board of Health.

Passed May 20th, 1907.

(Signed) C. F. RESSLER, *Clerk.*

I hereby certify that the above is a true copy of the resolution duly passed by the council of the village of Eaton, Ohio, at regular session of May 20th, 1907.

May 20th, 1907. (Signed) C. F. RESSLER,

(Seal). *Clerk of the Village of Eaton, O."*

This application was referred to a committee consisting of the Toledo member of the Board and the chief engineer, who considered the matter on June 26th, 1907, and made recommendations upon which the following action was taken, July 5th, 1907:

"In view of the fact that not more than 1,200 people are expected to use the proposed sewerage system of Eaton within the next five years, according to revised data furnished by the village council, the State Board of Health hereby amends conditions No. 1 and No. 2 of its letter of approval of April 29th, 1907, to read as follows:

1st. That the sand filters be enlarged to an area of one acre for the first installation, and that plans showing this enlargement be submitted to and receive the approval of the State Board of Health; and,

2nd. That a further increase in the area be made when the average daily flow of sewage reaches 100,000 gallons (which flow is estimated to represent a population of 1,200 people using the sewers); if the State Board of Health at that time deems such enlargement necessary.

This action is taken with the provision that the council pass a resolution directing that no person be allowed to use the sewers without first obtaining a permit from said council, and that an accurate record of all connections be kept."

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR PROPERTY OF THE OHIO REALTY AND CONSTRUCTION COMPANY, GRANDVIEW, FRANKLIN COUNTY.

On June 11, 1907, there were received from Messrs. E. G. Bradbury and George P. Shute of Columbus, plans and specifications for sewerage and sewage purification for certain property owned by The Ohio Realty and Construction Company, located in the village of Grand-

view, Franklin County. These plans were referred to the chief engineer, and the following report was submitted:

The total area of the district to be served is thirty-four acres. There are no sewers in this district at present, and consequently, the owners find it difficult to sell their property. It is, therefore, intended to build a complete system of sewers and a sewage purification plant. About one mile of 8-inch sewers will be built, and this is probably all that will be necessary for both present and future uses.

At the present time there are fourteen houses upon the property, containing an estimated population of about fifty people. It is estimated that there will probably be a population of 150 persons in three years and 400 persons ultimately. The purification plant is designed to serve the estimated population for the next three years, at least, after which time it is expected that a municipal plant will be constructed. The quantity of sewage for which the plant is designed is 10,000 gallons.

The method of sewage purification is to consist of screening, treatment in septic tanks, sand filtration, and final treatment with copper sulphate for the purpose of disinfecting the purified sewage. The screen chamber, septic tanks, and dosing tank will be located immediately south of Goodale Boulevard, so-called, and between this boulevard and the Pennsylvania Railroad. The filters and treating chamber will be located immediately south of the Pennsylvania Railroad. No land has yet been bought as a site for the plant, however.

It is proposed to discharge the effluent into a small intermittent stream which discharges into the Scioto at a point about 1 1-2 miles above the present intake of the Columbus water supply, The purified effluent will, therefore, have about 2 miles to flow before reaching the intake.

The intention is to build this plant largely as a temporary measure, as it is realized that other means for disposing of the sewage from this and adjacent territory will have to be provided for before many years.

While the plant above described, if properly operated, would satisfactorily purify the sewage from the number of persons for which it is designed, yet it would be much more desirable, as a permanent means of solving the sewerage problem in the vicinity of Grandview, Arlington, and Marble Cliff, to build a main sewer for this territory discharging into the system of the city of Columbus.

The Columbus member of the Board and the Secretary visited the location July 5, 1907, to determine the relation of this proposed plant to the water supply of Columbus. They reported that Columbus had built an impounding dam in the Scioto River and a few miles below had provided a filtration station, with a temporary intake from the Scioto River; that ultimately a closed conduit would convey the water from the dam to the filtration plant, but for the present the water would be taken directly from the river. The proposed sewerage system of Grandview

would discharge the effluent from the purification plant into a small run which empties into the Scioto River about one and one-half miles above this present intake and Grandview being a rapidly growing suburb of Columbus, that section will probably have, in a few years, several thousand inhabitants. They were therefore of the opinion that the effluent from the sewage disposal plant should not be permitted to be discharged above the intake for the Columbus water works, that it was possible for the whole territory, which will undoubtedly be annexed to Columbus in the near future, to have a sewerage outlet into the intercepting sewer of Columbus by gravity, a distance of probably less than two miles.

The Board therefore, on July 23, 1907, disapproved the plans for sewerage and sewage disposal for the property owned by The Ohio Realty and Construction Company, located in the village of Grandview, and recommended that the village authorities consider the proposition of connecting the sewers from this property and other territory of the village to the Columbus sewer system.

Later the consulting engineer reported that this had been done and that the cost would be approximately $20,000.00, whereas the greatest amount the village could possibly raise under the statutes, even by a vote of the people, was $12,000.00.

On August 19, 1907, Mr. Bradbury, together with Mr. Freeman, one of the officials of The Ohio Realty and Construction Company, called upon the Secretary and requested that the matter be reconsidered. It was desired to build the plant as shown on drawings submitted, except that instead of discharging the purified sewage into a ditch it was proposed to dispose of it by broad irrigation upon land adjacent to the proposed works.

On August 24, 1907, the chief engineer of the Board visited the proposed site and investigated several test pits which had been dug. These test pits showed the soil to be of a distinctly gravelly nature, and it was believed that one acre, properly graded and ditched (top soil being removed wherever the ditches are located) would absorb the effluent from the sewage works.

The matter was presented to the Board at its meeting held August 30, 1907, and it was decided to give the three members not present an opportunity to vote upon the matter. The members all voted to approve the plan for constructing the sewage purification works as shown on drawings submitted to the Board June 11, 1907, provided the effluent of the sand filters be disposed of by discharging upon the land immediately south of the plant, and that at least one acre be suitably graded and gravel ditches constructed to receive the effluent. The authorities were notified of this action October 7, 1907, and were advised that plans showing this graded area should be submitted for subsequent approval.

REPORT ON CONDITION OF KENTON SEWAGE PLANT WITH SPECIAL REFERENCE TO CONSTRUCTION OF LAND DRAIN BY COUNTY COMMISSIONERS.

On March 12, 1907, a communication was received from Mr. J. R. Stillings, city solicitor of Kenton, requesting an investigation by Board of the Kenton sewage plant, and also requesting advice as to the desirability of discharging the effluent from the sewage plant into a proposed land drain. On March 13, 1907, one of the special assistant engineers of the Board visited Kenton, and the following report was made:

PROPOSED LAND DRAIN.

In conversation with the city officials, it was learned that some weeks since a resident of the county, Mr. D. J. Grindle, purchased a farm of about forty acres located approximately one mile below the Kenton sewage plant. In order to drain this land, he interviewed the county commissioners with a view to having a tile laid for that purpose. As a result of his application, the county commissioners propose to carry a tile from the head waters of the North Kenton District to a point about one mile below the Kenton sewage plant, a total distance of approximately three miles.

The plans as first proposed were such that the present outlet for the city sewage plant would be closed; or, in other words, the natural waterway for the effluent would no longer exist. In view of this fact, the city officials had a conference with the county commissioners, representing that the proposed tile should be constructed at such a location that it should receive the effluent from the sewage plant.

As soon as this proposition was brought forth by the city officials, several farmers living in the vicinity of the plant, objected on the ground that were the effluent discharged into the *closed* tile, the beneficial effect of aeration in the open ditch, as now prevailing, would be lost, and that the effluent when discharging at the outlet of the drain would tend to create a nuisance. They also contended that at times objectionable matters were noted in the brook which receives the effluent from the sewage plant, and, further, that oftentimes the sewage plant itself had given rise to considerable nuisance from odors.

In order to allow the city time to present its side of the case, the county commissioners agreed to withhold their final decision in the matter until Friday, March 22, 1907. In the meantime, the city solicitor communicated with the State Board of Health, asking their advice in the matter, particularly as to the present condition of the Kenton sewage plant and as to the probability that the discharge of the effluent from the plant into a closed tile would tend to create a nuisance at the discharging point.

CONDITION OF KENTON SEWAGE PLANT.

Review of Evidence from Previous Investigations. The sewage plant, constructed to dispose of the sewage of the North Kenton District, was built in 1901, and since that time it has been examined four times in detail and inspected twice. As indicated in the Annual Report of the State Board of Health for the year 1903, the plant from analysis of samples collected on November 29, 1902, showed a high percentage removal of organic matter and a well nitrified effluent. Since that date, however, samples collected on September 18, 1903, September 5, 1904, and August 5, 1906, respectively, have indicated that the plant is not satisfactorily effecting the purification of the sewage from the North Kenton District. There has been practically an absence of nitrification, and judging from the analytical evidence as a whole, the effluent has been of a putrefactive character for a greater part of the time. The leading data obtained during past examinations, are listed in the following table.

TABLE SHOWING CHARACTER OF EFFLUENT FROM KENTON SEWAGE PLANT.

Date.	Hour.	Parts per Million.	Nitrogen as				
		Oxygen Consumed	Organic.	Free Ammonia.	Nitrites.	Nitrates.	Putrescibility.
Mar. 29-30, 1902.	9:30 A. M. to 9:30 A. M.......	7.5	0.93*	5.65	.500	4.4	0
Sept. 18, 1903....	....	29.	0.92*	10.34	.044	0.0	+
Sept. 5, 1904.....	8:00 A. M. to 3:00 P. M.......	8.4	1.01*	13.23	.016	1.0	+
Aug. 5, 1906.....	8:00 A. M. to 8:00 P. M.......	30.	4.2	10.00	.004	0.0	+

* Albumnoid Ammonia.

Effect of Wet Weather. The population connected with the North Kenton Sewerage District is estimated at about 400 people, and the dry weather flow may be safely estimated at 25,000 gallons in twenty-four hours. It is very probable, moreover, that during the night very little sewage is discharged. Measurements made on August 8, 1906, indicated that the rate of the flow for the day hours (8:00 A. M. to 8:00 P. M.) was about 20,000 gallons.

For sometime past and probably since the plant was installed, considerable difficulty has been experienced owing to the fact that during wet weather the quantity of sewage is largely increased and the dosing

siphons operate practically continuously. The city officials have long suspected that in some way street water was connected with the sewers, but so far as is known at the present time, no record was ever made of such connection. However this may be, on March 13, 1907, the writer made a rough measurement of the sewage flow at the plant and found it to be about 260,000 gallons daily. This may be considered a rate of flow probable under extremely wet weather conditions.

Some time ago there was constructed at the inlet end of the septic tanks north of the present screen chamber, a second chamber of practically the same dimensions, serving as an overflow; this chamber contains a 20-inch pipe leading to the brook, through which the excess of sewage discharges during wet weather. This construction was deemed necessary as the inlet piping in the septic tank was not sufficient to carry the sewage flow under wet weather conditions, with the results that crude sewagic material was discharged on to the neighboring farms and tended to create a nuisance. When visited on March 13, 1907, the overflow was in full operation, and a rough weir measurement indicated that about 85,000 gallons of sewage was being discharged. In round numbers it may be said that the flow in times of storms is about ten times as great as during dry weather.

Detrimental Effect on Plant. The increased quantity of sewage during wet weather, causes the siphons to operate at very frequent intervals and affords very little opportunity for the drying out of the filtering material and the admission of air which is probably essential for the success of the wave filter method of purifying sewage. The continued use of the plant during wet and dry weather since its construction, has resulted in a considerable accumulation of organic matter on the filtering material; and as the analyses indicate, the plant is not capable of producing a non-putrescrible effluent, and probably, except during wet weather when the dilution afforded by the rain water would in itself be sufficient to produce a stable effluent, the effluent as discharged into a dry ditch—or in other words, without dilution—would tend to putrefy and would create a nuisance from odor. Such a condition has been noted in the past and was remarked by Mr. Paul Hansen in a report on the Kenton sewage plant, in September, 1904.

One of the chief objections to discharging the effluent from the Kenton plant into the proposed land drain is the fact that obnoxious material would be carried down through the tile at times of storms. This condition presumably is to be attributed to the overflow which has already been described, and, were the surface water removed from the sewers, the objection could no longer be valid. The second point with reference to the discharge of the effluent refers to the feature of a stable effluent at times when there is no diluting water in the tile. Analyses have indicated that the effluent during dry weather is not satisfactory and hence if discharged into a dry ditch under summer conditions,

would putrefy and tend to create a nuisance. Provided the present clogged filtering material be replaced or cleaned, with the permanent removal of storm water from the sewers, it is possible that the plant will produce a more satisfactory effluent. If this expedient does not prove successful, for an expenditure not to exceed $1,500, the plant may be so changed or modified as to insure a stable effluent at all times.

SUMMARY.

From available information as to the present problem and the condition of the Kenton sewage plant, it is thought that the removal of storm water will result in increasing the purity of the resulting effluent. The occasional discharge of objectionable matters will no longer be noted during storms, and hence, the problem relates only to the stability of the effluent.

If efforts to exclude the storm water prove successful, a thorough overhauling and cleaning of the filtering material will probably tend to improve the character of the final effluent. If the desired degree of purity is not obtained by this means, modifications in the plant, costing not to exceed $1,500 will probably insure an effluent which will not give rise to a nuisance at the discharge of the proposed land drain.

A copy of this report was sent to the board of public service and attention called to the fact that this report, together with past investigations of the Board, indicated that under present conditions the plant can not be depended upon to produce a non-putrescrible effluent; that the plant would doubtless be much more efficient if all surface water were excluded from the sewers and if the filtering material were removed from the filters and thoroughly washed; but that even with these changes it is doubtful whether a non-putrescrible effluent would be produced at all times; and if that should be found to be the case, there could be a reconstruction of the plant at an expenditure of probably not to exceed $1,500, which would probably insure a satisfactory effluent at all times.

REPORT OF PROPOSED SEWAGE PURIFICATION PLANT FOR FOREST CLIFF, LAKEWOOD.

On March 15, 1907, Mr. Charles W. Root, engineer for Forest Cliff, submitted plans for a proposed sewage purification plant for that place. The plans were referred to the chief engineer, and the following report was made.

Forest Cliff is a private allotment located within the village of Lakewood, bordering on the shore of the lake. The lake frontage is

approximately 300 feet and the allotment extends back to Lake Avenue, a distance of 840 feet, thus giving an area of about eight acres.

When fully built up, it is expected that Forest Cliff will contain a population of 160. At present there are but one or two houses. Based on a flow of 60 gallons per capita daily, the ultimate quantity of sewage to be treated will be somewhat less than 10,000 gallons per day. Forest Cliff is sewered on the separate plan. The main domestic sewer is 8 inches in diameter and about 800 feet long. Ample provision is made for caring for storm water in 12-inch and 15-inch sewers.

The sewage purification plant will be located on the edge of the cliff, bordering the lake and in the extreme northeasterly corner of the allotment. The plans provide for two septic tanks to be used in tandem, a dosing well, and two filters on which the effluent from the tanks is to be discharged through sprinkling nozzles. The septic tanks are to be 8x5x6 feet deep, giving a total capacity of 3,700 gallons, or approximately eight hours' flow when the plant has reached its capacity.

The dosing well is 6 feet in diameter, holding 6,400 gallons. It is to be discharged by an automatic siphon. The two filters are each 15 feet in diameter and 6 feet deep. They are to be filled with crushed stone, varying in size from 1 inch to 3 inches in greatest dimension. Each filter is underdrained by tile drains covering the entire bottom. The sewage is to be distributed through a sprinkling nozzle located in the center of each filter. Means are also provided whereby the flow can be diverted from one filter to the other. Based on their ultimate capacity, the rate of filtration through each filter will be 660,000 gallons per acre per day, which is quite conservative.

On March 21, 1907, the Board approved these plans provided that the operation of the plant be at all times satisfactory to the State Board of Health.

It was also suggested that, on account of the small quantity of sewage which would reach the plant for the next few years, only one septic tank be used at first.

REPORT ON SEWERAGE AT LEBANON.

On January 21, 1907, plans showing existing and proposed sewers for the village of Lebanon were submitted to the Board by the mayor and village solicitor. Dr. A. W. Mardis, health officer, appeared before the Board at its meeting held January 23, 1907, and asked that these plans be approved.

In 1898 the Board considered plans which showed an outlet into the north branch of Turtle Creek. Action was taken as follows:

"The Board * * * approved a sewerage outlet into Turtle Creek at or below its confluence with the north branch, but upon the condi-

tion that, whenever it shall be deemed necessary by the State Board of Health, the sewage discharged thereby shall be purified in a manner satisfactory to said Board."

An inspection by the chief engineer, October 9, 1906, of the conditions in the village, showed that an outlet into Turtle Creek had been constructed, although no plan had been previously submitted showing its location. The new plans show the location of the existing outlet which it is proposed to use temporarily.

The Board at its meeting approved the present temporary outlet to the main sewer, as shown on the plans submitted January 21, 1907.

REPORT ON A STORM WATER SEWER FOR LEIPSIC.

On June 12, 1907, Mr. Riggs of The Riggs and Sherman Company of Toledo, appeared before the Board and presented plans for a storm water sewer for the village of Leipsic. The sewer was approved by the Board at this meeting and notice of such action was sent to the mayor and council of Leipsic in the following letter dated June 21, 1907:

"*To the Mayor and Council, Leipsic, Ohio.*

DEAR SIRS:—At a meeting held June 12th, 1907, the State Board of Health considered plans for a storm water sewer for the village of Leipsic, prepared by The Riggs and Sherman Company and presented by Mr. Riggs on that date.

You are hereby notified that these plans were approved provided the council pass and enforce an ordinance prohibiting all house connections with said sewer except for cellar drainage; and that a copy of such ordinance be filed with the State Board of Health.

Yours truly,

(Signed) C. O. PROBST,

Secretary."

"By order of the Board."

The local authorities failed to meet with the requirement that an ordinance be passed prohibiting all house connections with the sewer except for cellar drainage. After the sewer was constructed the Board was advised by Dr. W. H. Hickey that it was being used contrary to the conditions of approval of the Board and that no action was being taken by the local authorities to prevent this unlawful use.

After numerous complaints, the Secretary of the Board wrote the following letter on November 18, 1907, to which no reply has as yet been made.

"*To the Mayor and Council, Leipsic, Ohio.*

DEAR SIRS:—We are informed that you are permiting connections to be made to the sewer which was recently approved by this Board for purposes other than that for which the approval was given. It is stated that a number of connections have

been made for the purpose of carrying off water closet wastes. This is contrary to the terms of the approval, and we will expect the village to comply with the provisions laid down for this sewer if it is to be used, and I shall expect to receive a copy of the ordinance provided by council prohibiting the use of the sewer for any purpose except that contemplated in the approval.

Yours truly,

(Signed) C. O. Probst,

Secretary."

REPORT OF PROPOSED CHANGE OF LOCATION FOR THE SOUTHERLY PURIFICATION PLANT FOR MEDINA.

On August 21, 1907, Mr. E. G. Bradbury, consulting engineer for Medina, submitted a plan showing proposed change of location for the southerly sewage purification plant which is about to be constructed. This plan was referred to the chief engineer and the following report was submitted.

In July, 1906, the State Board of Health approved complete plans for sewerage and sewage purification for Medina, provided:

"1st. That both the northerly and southerly plants be enlarged in a manner satisfactory to the State Board of Health whenever this is necessary in the opinion of said Board; and,

"2nd. That the operation of the sewage disposal plants be at all times subject to the approval of the State Board of Health."

The contract for a large part of the work has been let. The owner of the land which was chosen as a site for the filters (of the southerly purification plant), refused to sell his property to the village.

In order to avoid delaying the work by taking legal steps to procure this land, it is desired to change the location of the southerly plant to a point two or three hundred feet farther north. In addition, the septic tank, which according to the original plans was on top of a hill 1000 feet distant, will be relocated at the same point proposed for the filters. This would be an advantage.

The location now proposed is approximately 500 feet from the nearest house and there are five houses 800 feet distant. The plant will be located at the foot of a steep hill, which will be cut off from the view of the above houses and will also probably tend to prevent odors, if any, from spreading.

On the other hand, the new location is just about as near to the nearest house as would ordinarily be safe.

At a meeting of the State Board of Health, held August 30, 1907, this plan, providing for the location of the southerly sewage purification plant at a point two or three hundred feet farther north, was approved.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR MILAN.

The consulting engineers for the village of Milan, Messrs. E. G. Bradbury and George P. Shute, submitted plans for proposed sewerage and sewage purification plant on April 16, 1907. In anticipation of these plans being submitted, the chief engineer visited Milan on October 17, 1906, for the purpose of making the necessary inspection. The plans were examined and the following report made:

The village of Milan is located in the southerly part of Erie County and is situated on a level plateau bordering the Huron River, about 80 feet above that stream. The estimated population of the village is 1,100.

There are at present no sewers in the village except two storm drains in Main, Center and William streets, which receive the sewage from four or five houses.

The proposed plans for sewers provide for a separate system, the minimum size of sewers being 8 inches and the maximum 12 inches. The total length will be about five miles: two miles will be built at present. The system is designed to serve a population ultimately of 7,500, based on a population of 50 per acre within the corporate limits. No storm, roof or cellar water will be admitted to the domestic sewers. The sewers will be ventilated through perforated manhole covers and untrapped soil pipes. The sewage will be strictly domestic in character.

The storm drain system consists of short lines of pipe from 12 to 24 inches in size, discharging into numerous natural water courses.

The system proposed for sewage purification consists of septic tanks and contact filters.

The main sewer from the village will discharge at the site for purification works, located just outside of the northeasterly corner of the corporation. This site covers an area of about two acres and is bounded on three sides by a small intermittent creek which discharges into the Huron River about 400 feet below the site. The nearest buildings to the site are 900 feet distant, and practically all the area within 1,000 feet of the site is not suitable for building.

The plant is designed to have an ultimate capacity of 150,000 gallons per day. This will represent the sewage from 2,000 people at 75 gallons per capita. It is not expected, however, that more than 500 people will use the sewers within ten years; and on this basis the flow will not be over 40,000 or 50,000 gallons for a long time in the future. If it ever becomes necessary to enlarge the area, the land across the stream is suitable.

For present installation it is proposed to build one-half the plant, that is, enough area to purify 75,000 gallons per day.

The sewage on arriving at the plant passes into a screen chamber

provided with a screen having a 1-inch open space, and from thence into septic tanks. These tanks are to be of reinforced concrete and covered. They will be 19½ feet long and 7 feet deep. One will be 5 feet 4 inches wide and the other 10 feet 8 inches wide, giving a total capacity of about 25,000 gallons. The capacity of the smaller will, therefore, be 8,300 and of the larger 16,700 gallons, thus giving a variable capacity as the flow of sewage increases. The sewage will be admitted to and drawn off from the tanks at points three feet below the surface.

After being aerated, the septic tank effluent passes to a concrete chamber, in which will be located the automatic controlling device. The type of this device has not yet been selected.

The contact filters for the entire plant will be six in number, in two groups of three each, and one group will be built at the beginning. Each filter is one-thirtieth of an acre in area, with an average depth of 5 feet. The three filters, therefore, provide 225,000 cubic feet of filtering material. Based on one-third voids and a flow of 75,000 gallons per day, the filters will operate at a rate of one and one-half cycles per day, which is entirely conservative.

The plant is to be placed well above flood waters.

The plant, as designed, judging from experience with contact filters in general, will produce most of the time a non-putrescible effluent. It is possible that at certain times, however, the effluent may be putrescible. On the other hand, the large volume of flow and the character of the Huron River, would undoubtedly permit of the discharge of even a putrescible effluent, provided a reasonable proportion of the organic and suspended matter was removed from the sewage.

At a meeting held April 24, 1907, the State Board of Health considered these plans, as submitted April 16, 1907, by E. G. Bradbury and George P. Shute, consulting engineers, and the plans were approved, provided:

1st. That the sewage purification plant be enlarged in a manner satisfactory to the State Board of Health whenever such enlargement is necessary in the opinion of said Board.

2nd. That the operation of the plant be at all times subject to the approval of the State Board of Health.

3rd. That the main outlet for the effluent be continued to the Huron River instead of being discharged into the small creek bordering the site for the sewage purification works.

4th. That samples showing the size and quality of the filtering material to be used, be submitted to and receive the approval of the State Board of Health before it is placed in the filters; and,

5th. That detailed drawings of the controlling apparatus be submitted to and approved by the State Board of Health before installation.

REPORT ON PROPOSED STORM WATER SEWER FOR MILFORD.

On August 24, 1907, plans for a proposed storm water sewer for Milford were received from Dr. Con W. Gatch, health officer, with a request for approval of the same by the State Board of Health. The matter was referred to the assistant engineer who had previously (June, 1907) reported on an investigation of a nuisance at Milford. This report recommended the construction of a proper system of sanitary sewers and also set forth suggestions for giving immediate though temporary relief to existing unsanitary conditions. The plans for the proposed storm water sewers were reported upon as follows:

The proposed sewer, as indicated on plans submitted, begins in an existing cistern or catch basin at the corner of Locust and Water streets; thence it extends in a general south-southwesterly direction, passing through Water, Elm and Polk streets and finally discharging into the Little Miami River just above the highway bridge at the foot of Mill and Water streets.

As nearly as can be learned from the plans submitted, the sewer is to be constructed of vitrified sewer pipe 24 inches in diameter. The total length will be in the neighborhood of 1175 feet.

It is understood, though not specifically stated on plans, that this sewer will intercept the flow from the existing storm sewers in Locust and Elm streets and will also drain several stagnant pools that lie between Polk and Water streets.

The construction of the proposed sewer is undoubtedly greatly needed for alleviating present unsanitary conditions, caused by the discharge of putrescible wastes from existing sewers into depressions formed by the bed of an old mill-race where said wastes undergo active putrefaction. However, before construction is permitted conditions of approval are recommended.

At a meeting of the Board held August 30, 1907, the above plans and report were considered, and the plans were approved, provided:

1st. That the proposed sewer be constructed of vitrified sewer pipe laid to an even grade and with carefully cemented joints.

2nd. That at each change of direction or grade or intersection with other sewers there be placed a properly constructed manhole.

3rd. That the proposed sewer intercept all existing sewers between Locust Street and the proposed outlet, and that the existing sewers where necessary be reconstructed to even grade so as not to permit water to stand stagnant along their inverts.

4th. That the existing cistern in Locust street, from which the proposed sewer is to start, be removed and that there be constructed in its place a suitable catch basin that will not permit the accumulation of putrescible wastes.

5th. That at the end of the existing sewer in Locust Street there be placed an automatic flush tank or manhole, by means of which, or through which, the sewer may be thoroughly flushed.

6th. That an ordinance be passed by council, prohibiting the additional discharge of putrescible wastes or sewage into the proposed sewer or existing sewers that may become tributary thereto. (This should not be taken to mean a certain amount of wash water and sink drainage that unavoidably finds its way into gutters). And,

7th. That before construction, more detailed plans and specifications embodying the above conditions be submitted to the State Board of Health.

The council was notified of this action September 18, 1907, and their attention called to the fact that the proposed sewer was only for the purpose of bringing about immediate relief from certain of the most unsanitary conditions existing in the village and that ultimate and permanent relief could only be obtained by the construction of a suitable system of sanitary sewers.

REPORT ON PROPOSED STORM WATER SEWER FOR NELSONVILLE.

Under date of September 12, 1907, a communication was received by the State Board of Health, requesting approval of the construction of a storm water sewer to serve a portion of the city of Nelsonville. The matter was referred to the engineering department and the following report was submitted.

Nelsonville is in the northwestern portion of Athens County on the Hocking River. Its population is estimated at 7,000, but it is probable that this estimate is somewhat too high. The area within the corporation limits is approximately two square miles. The surrounding country is very hilly, the hills rising from 200 to 250 feet above the river level. The bottom land in the valley varies from one-fourth to one-half mile in width and in general is quite flat. The city is situated in a wide portion of this bottom land.

In May, 1907, when an examination was made of the public water supply, Nelsonville was in some disorder and many of the streets were in bad repair owing to the damage done by a severe flood during the month previous. Under ordinary circumstances, however, it is believed that the general sanitary conditions are good. Garbage and refuse are removed by private parties at irregular intervals and dumped on a plot of land to the north of the city. Some of the material is burned on the dump and the garbage is generally covered with earth. Considerable of the lighter refuse is dumped in and about town, especially along the course of an old canal which is now in disuse. The waste disposal

problem has been the most troublesome with which the city authorities have had to contend, and present conditions are not considered satisfactory. The old canal constitutes the most serious nuisance with which the city has to deal. Generally it contains stagnant water and forms a breeding place for great numbers of mosquitoes during the summer time. The city authorities would like to fill in the canal, but as yet have been unable to obtain permission for so doing from the state authorities.

Nelsonville is provided with a fairly complete system of sanitary sewers, having a single outlet into the Hocking River at a point below town. The system was constructed in 1895 and has not been changed except for the addition of some new laterals since that time. The grades, owing to the flatness of the land on which the city is built, are rather low, resulting in occasional clogging. Another unsatisfactory feature in connection with the sewers is the fact that the river frequently backs water into them so as to flood cellars. This, of course, is less the fault of the sewers than the low level of the ground on which the city is built. The main outfall sewer discharges below the surface of the water in the river. The sewage may be plainly seen for some distance below the outlet, but no nuisance in the vicinity was noted at the time of examination. It is possible that during extreme low water in the summer, odors may arise, but it is not believed that these would give offense for the reason that there are no houses within 2,000 or 3,000 feet of the outlet.

It is proposed to construct a brick arch sewer along a natural watercourse near the center of the city, known as Shafer Run. The total length of the sewer proposed is about 1,300 feet, and the cross-section presumably will be large enough to accommodate the greatest storm water flow that may be anticipated. The area to be drained by this sewer is approximately 120 acres, in which all streets are paved. About one-fifth of the area is business district and the other four-fifths residence district. The whole area is provided with sanitary sewers so that there will be no occasion for discharging sanitary wastes into the proposed sewer, nor do the authorities intend to permit connections for such purpose to be made.

Until the present time the natural drainage through Shafer Run has been discharging into the Hocking Canal, where it has stood in offensive stagnant pools. The proposed sewer will carry the drainage to the Hocking River and no doubt can also be made to drain the canal bed and thus partly do away with the nuisance so long occasioned by the canal.

At a meeting held October 16, 1907, the Board approved the plan for this storm water sewer (submitted September 18, 1907, by Mr. Emmitt Keenan, president of council), upon the condition that no sanitary sewage be permitted to enter therein.

REPORT ON STORM SEWERS FOR NEW PHILADELPHIA.

On August 1, 1907, there were submitted, by Mr. C. J. Knisely, city engineer of New Philadelphia, plans for storm sewers in South Broadway and adjacent streets. These plans were referred to the chief engineer, who reported upon the same as follows:

The sewers proposed are for storm water only. They are two in number and both are of vitrified pipe. One is 18 inches in diameter and 275 feet long, and is to discharge into the Tuscarawas River at the South Broadway bridge. The other is 24 inches in diameter and 100 feet long and will discharge into the canal at the same street. Approval of this latter sewer has been secured from the State Board of Public Works. The area to be drained by the 18-inch sewer is three acres, and that to be drained by the 24-inch sewer, seven and one-half acres.

The Board, August 7, 1907, approved these plans, as shown on the drawing submitted by the city engineer on August 1, 1907, provided the council first pass an ordinance prohibiting the use of these sewers for domestic purposes of any kind and file a certified copy of such ordinance with the State Board of Health.

[Such an ordinance (No. 360) was passed by the council of New Philadelphia on August 9, 1907, and filed with the State Board of Health August 12, 1907:]

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR NEW PHILADELPHIA.

On October 14, 1907, there were submitted by Paul R. Murray of New Philadelphia and E. G. Bradbury of Columbus, plans and specifications for a complete sewerage system, with sewage purification works, for the city of New Philadelphia. These plans were referred to the chief engineer who visited New Philadelphia on October 25, 1907, and inspected the site for the proposed purification works. The following report was made:

New Philadelphia is the county seat of Tuscarawas County and has a population of about 8,000. The city is built on a broad plateau, which is forty to fifty feet above the present mean water level of the Tuscarawas River. The area within the corporation limits is about four square miles. The old portion of the city, covering an area of 250 acres, has been provided for the last twenty years with combined or domestic sewers. The present main outlets, two in number, are located well up on the bank of the Tuscarawas River, only a short distance from the edge of the built-up portion of the city. Much complaint has from time

to time been caused by the existence of these sewer outlets, and some of the residents of the city have taken legal steps to have their locations changed. The nearest public water supply intake below New Philadelphia is at Zanesville, some sixty miles distant following the stream.

On March 18, 1907, the assistant engineer made an investigation of sewerage conditions at New Philadelphia, as an extension of the sewerage system was then being contemplated. Based on his report, a communication was sent to the president of the council, reading as follows:

"It was learned that your city is contemplating the construction of additional sewers which will have an outlet near the point where the present sewers discharge. You are aware, no doubt, that plans for such a system must be submitted to the State Board of Health for approval before it can be built. While it is impossible to predict the action of the Board in any particular case, certain general requirements have become the rule; and in order that your plans may be presented in proper form for the Board's action, I would suggest that you embody the following features:

"(1) The sewers should be built on the separate system; that is, domestic sewage and storm water should be carried by separate conduits.

"(2) The sanitary sewers should all be conducted to a single point of discharge at a site suitable for the location of sewage treatment works.

"(3) The sanitary system should be so designed that ultimately the entire area of the city may be made tributary to it.

"(4) As the Tuscarawas River is already carrying as much sewage as it safely can without the creation of a nuisance during low water, your plans should show a suitable plant for treating the sewage before it is allowed to discharge into the river.

"(5) The plans submitted must show all details of construction, and one of our regular blanks for proposed sewerage must be properly filled out."

Proposed Plans. The plans now submitted are in accordance with the above suggestions. The new system will make use of the existing sewers for domestic purposes; but all surface water inlets will be removed from them and new storm water sewers will be built. The entire area of the city, with the exception of a small district in the westerly portion, can be drained by gravity into a main sewer extending parallel with the northerly bank of the Tuscarawas River to purification works located a mile below the corporation line. The new lateral sewers will be 8 inches to 12 inches in diameter and the new interceptor will be 18 inches to 26 inches in diameter, terminating in a 2 x 3-foot trunk sewer in the alley between Front and St. Clair streets near First Street. The minimum grade used on the lateral sewers is 0.2 per cent. and on the interceptor 0.1 per cent. These minimum gradients are said to be the best obtainable on account of the topography. All dead ends, about seventy in number, will be provided with automatic flush tanks. The present sewers, relieved of storm water, will discharge into the interceptor. The new system, including the present sewers, will accommodate a population of 50,000.

The trunk sewer terminates in a siphon chamber, in which will be located a screen of 1-inch mesh and two 14-inch automatic siphons discharging into a chamber, which is connected with a 14-inch cast iron inverted siphon, 6,000 feet long, extending to the purification works. Provision is made for duplicating this inverted siphon when it becomes overtaxed.

The storm water sewer system is not extensive, as the sandy soil reduces the necessity for drainage at points where the water naturally collects. There will be three outlets into the Tuscarawas River and two into Beaver Dam Creek.

The purification works will be located on a flat area of sandy soil, about one mile east of the corporation line, on the northerly side of the Tuscarawas River. The plant will be nearly one-half mile from the public highway and there are no houses nearer than this.

The purification plant is designed to treat 1,200,000 gallons of sewage per day. This is a very liberal capacity, considering that the population of the city is not more than 8,000 at the present time. It is not expected that the full capacity of the plant will be reached for twenty years. The method to be used is septic tank treatment followed by intermittent sand filtration.

The sewage on reaching the works through the above mentioned 14-inch inverted siphon passes into a screen chamber 6 feet square with a screen having a mesh of 1-inch open space. From here the sewage passes into one or all of the four septic tanks. Each of these tanks is 52 x 26 feet by 7½ deep; the total capacity is, therefore, 300,000 gallons, or six hours' flow, based on a 1,200,000-gallon capacity. Only one or two tanks need be used until the increased flow of sewage warrants the use of all of them. The inlet and outlets of the tanks are controlled by sluice gates and weirs. The tanks are to be built entirely of concrete, including a reinforced concrete roof.

The effluent from the septic tanks, after passing over aerating plates, will enter a dosing chamber, eight feet wide and 100 feet long, and extending across the ends of all four tanks. The capacity of the chamber is 24,000 gallons. The contents will be discharged by a system of four automatic siphons and conveyed, in rotation, to four gate chambers. At each gate chamber the flow of four filters will be controlled.

The filters are sixteen in number, each 165 feet square and having a total area of 10 acres. Each filter will be drained by four lines of 6-inch underdrains.

The filtering material will consist of 6 inches of screened gravel overlaid by 2½ feet of sand. The sand is to be obtained from a nearby bank. Samples which have been analyzed by the State Board of Health show it to be excellent for filtering material. The size of the sand available varies somewhat, and the specifications control this by stating that the effective size shall be between 0.2 and 0.4 m.m. and that all particles larger than ¼-inch shall be removed by screening.

In addition to the sand filters proper, there will be provided a sludge bed 60 feet square, on to which the septic tanks may be drained when necessary.

Based on the nominal capacity of the plant, 1,200,000 gallons per day, the average net rate of filtration will be 120,000 gallons per acre per day. At the beginning, however, it is expected that the rate will not exceed 50,000 gallons per acre per day and that it will not reach its maximum for twenty years. The estimated population per acre at the beginning will be 600 and ultimately 1,600.

The bottoms of the filters will be at about the elevation of average high water in the Tuscarawas River, although this stream has been known to rise two feet above the proposed level of the filter surfaces. The underdrain outlet, however, will be provided with a check valve to prevent high water entering the filters, and an embankment rising above the greatest known high water mark will surround the entire plant.

November 6, 1907, the Board approved these plans, shown on drawings and described in specifications submitted by Paul R. Murray of New Philadelphia and E. G. Bradbury of Columbus, October 14, 1907, provided:

1st. That the sewage purification works be built before any of the new sewers are placed in use; and,

2nd. That the operation and management of the plant be at all times satisfactory to the State Board of Health.

REPORT ON PROPOSED SEWER IN VIENNA AVENUE, NILES.

On April 24, 1907, application was received from Mr. William Wilson, city engineer of Niles, asking approval of a proposed sewer in Vienna Avenue. Mr. Wilson also appeared before the Board at its meeting held the same day and explained the project. The application was examined by the chief engineer and the following report was made:

At the meeting of the State Board of Health on January 23, 1907, a general plan for a sewerage system for the city of Niles, drawn by Mr. Alexander Potter of New York, in 1893, was approved upon the condition that a sewage purification plant, satisfactory to the State Board of Health, be introduced before any more sewers were constructed for domestic use. The Board further suggested that all sewers built in the future should be on the separate plan in order to facilitate the purification of the sewage.

Since this action was taken, the city has employed a consulting engineer to prepare plans for sewage purification, and preliminary steps have been taken to acquire land for sewage purification works.

It is now desired to construct a sewer in Vienna Avenue, 33 inches in diameter and about 3,000 feet long, discharging into Mosquito Creek just below the dam. The location of this sewer is shown upon the general plan submitted in January, 1907. This sewer is to be used for storm water and cellar drainage only.

It is the intention, when the complete system with the purification plant is constructed, to convert this Vienna Avenue sewer into a combined sewer. However, to use this sewer on the combined plan would not be in accordance with the advice of the State Board of Health given at its last meeting and would be detrimental to the economical construction and operation of the purification plant. The permanent use of this sewer as a storm sewer, with cellar drain connections, would not be inconsistent with the ultimate plan for sewerage and sewage purification, although it would be perhaps somewhat safer, in order to prevent improper connections with the sewer, to connect the cellar drains with the future domestic sewers.

It might be mentioned that in 1899 the State Board of Health approved a storm water sewer in Robbins Avenue, with the provision that the city clerk furnish the Board with a copy of the agreement of all property owners residing on this street (as mentioned in his letter of application of May 22, 1899) that they would not connect any water closets or vaults with said sewer. The provision has apparently been complied with, and when inspected by the chief engineer of the Board last July, the sewer was causing no nuisance in the creek.

At a meeting of the State Board of Health, held April 24, 1907, this plan for constructing a 33-inch storm sewer in Vienna Avenue from Davis Street to a point on Mosquito Creek immediately below the dam was approved, provided:

1st. That the council pass an ordinance forbidding the use of this sewer for anything but storm water and cellar drainage, and that a certified copy of this ordinace be filed with the State Board of Health; and,

2nd. That when the purification plant is built a new sewer be constructed in this street for domestic purposes only, and that all house connections, including cellar drains, be then connected to the new domestic sewer; or that the present proposed sewer be reduced in size and, when the purification plant is built, be used as a domestic sewer and other provisions be made for storm water.

REPORT ON PROPOSED METHOD OF SEWAGE PURIFICATION FOR OBERLIN.

On April 9, 1907, there was received from Mr. W. B. Gerrish, city engineer of Oberlin, a sketch showing proposed method of sewage puri-

fication to be used in connection with a new plant to be constructed by that village. Oberlin was visited by the chief engineer on April 10, 1907, and the following report was made:

The present sewage purification plant for Oberlin was built in 1894. It was designed upon intermittent filtration and broad irrigation principles. Three and one-half acres were divided into twelve filters and underdrained for intermittent filtration, while nearly two acres were ditched, but not underdrained, for irrigation. The natural soil upon the site of the filters was used. The soil is a sandy loam and on account of its fineness, its capacity for purifying sewage has proved to be very limited.

During the first five or six years of the operation of the present works, when the flow of sewage was only 75,000 gallons per day, the plant purified it in a fairly efficient manner; but when the flow increased to over 100,000 gallons per day (the quantity is now nearly 300,000 gallons), the plant ceased to be efficient and many complaints were made regarding the odors originating from the plant as well as from the pollution of the stream.

For the past three or four years, during the summer time, the plant has been operated upon a chemical precipitation basis. Copperas and lime have been introduced into the main sewer at certain points, and the filters instead of acting as such have been transformed into chemical precipitation basins. This chemical treatment improved conditions somewhat but the resulting effluent, according to the investigations of the State Board of Health, has not been satisfactory. Furthermore, during the winter, the use of the chemicals has not been continuous.

On account of the overworking of the plant and the resulting complaints therefrom, the village has recently purchased an area of about ten acres located on the opposite side of the creek and about one-half mile below the present plant. It is proposed to continue the main sewer to this point and there purify the sewage by broad irrigation along the same lines as the original plant, with the improvement that the land will be more thoroughly underdrained and sand will be placed around the underdrain tile in the trenches. It is also proposed to continue the use of chemicals, as this can be done satisfactorily in connection with the water softening plant, and thus remove a certain portion of the solid matter before the sewage is applied to the land.

The city engineer was informally advised that it would be much more satisfactory to construct two acres of sand filters 2.5 feet deep than it would be to underdrain and grade seven or eight acres of soil unsuitable for sewage purification purposes.

The city engineer replied that the suggestion was excellent except that the expense involved would be too great.

From computations made by our engineering department, however, based on a 400,000 gallon plant, it does not appear that the expense

would be increased more than thirty or forty per cent. by the method suggested. It would be more satisfactory to install one and one-third acres for the first season, providing for the remaining two-thirds acre the second season, than it would be to adopt the method of broad irrigation which has proven a failure.

At a meeting held April 24, 1907, the State Board of Health disapproved the method of sewage purification indicated by the sketch submitted by W. B. Gerrish on April 9, 1907.

The Board suggested to the engineer that he prepare, for the consideration of the State Board of Health, plans on the intermittent sand filtration basis, providing as much area as it is possible to pay for with the present financial condition of the village, and using fine broken stone, or similar material, for the lower portion of the filters, if by this means a saving could be effected.

August 19, 1907, the village solicitor reported that the question of obtaining sand had been investigated and that it had been found that the sand alone for a two acre plant would cost something like $12,000, and the other work and material (laying of tile, tanks, etc.) would make the price about $15,000. As only $10,000 was authorized for the sewage plant he asked that the State Board of Health sanction their proceeding with the construction of a plant whose area should not be more than an acre and a half, but of the same type as the two acre plant recommended by the chief engineer of the Board.

At a meeting of the State Board of Health held August 30, 1907, it was voted to approve the plans for sewage disposal for Oberlin with a filtration area of one and one-half acres provided that the area be increased whenever, in the opinion of the State Board of Health, an increased flow of sewage shall make this necessary, and that plans showing the proposed sewage disposal plant in detail be first filed with the Board.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR ORRVILLE.

Plans for proposed sewerage and sewage purification for Orrville were received from Mr. L. E. Chapin of Canton, consulting engineer, on August 29, 1907. In anticipation of these plans being submitted, the chief engineer visited Orrville on May 17, 1907, and in company with Mr. Chapin's representative made an inspection of the ground and discussed the general project. The plans were examined and the following report was made:

Orrville is a village of about 2,500 population, located in Wayne County. There are no sewers at the present time although some private drains are in use and discharge into a small creek running through the village.

The water supply, derived from deep wells, is used by about eighty per cent of the population. The daily consumption is estimated at 250,-000 gallons.

The plans for proposed sewerage provide for collecting the sewage from the entire town through pipe sewers, ranging from eight inches to fifteen inches in diameter, and discharging it at purification works located 600 feet north of the northerly corporation line and adacent to the C., A. & C. Railroad. This tract covers about seven acres and is admirably located for sewage purification works, there being no houses within 1,500 feet or more; and the marshy character of the surrounding land will prevent its use in the future for building purposes.

The purification plant has been designed to treat 400,000 gallons of sewage per day, or the sewage produced by 4,000 or more people. Street washings and roof water are to be excluded from the sewers.

The method of purification consists of septic tank treatment followed by contact filters and then by sand filters.

The septic tanks are two in number, each 45x30 feet, with an available depth of about six feet, thus making a total capacity of 120,000 gallons or 7.2 hours' flow based on 400,000 gallons per day. The tanks are provided with baffle walls in such manner that the sewage travels over a distance of three times the length of the tank; that is, it passes through a channel about nine feet wide and 130 feet long. When the plant has reached its capacity, with both tanks in use, the velocity of flow will be 0.33 foot per minute. This comparatively high velocity will probably serve to distribute the sludge more evenly over the bottom of the tanks.

The sludge bed, 64x100 feet in area and containing three feet of gravel, is to be located near the tanks; and the sludge will be pumped on to this bed by means of a vertical centrifugal pump geared to a long horizontal shaft extending to the end of the tank to a point where it can be connected with a traction engine, or other power.

The sewage passes out of each of the septic tanks through trapped weirs fifteen inches wide. Each weir is connected with a special contact filter and one or both can be used.

The contact filters are four in number, each approximately 150 feet long and having an average width of 35 feet. The area of each will be one-eighth acre, making a total area of one-half acre. The material in the contact filters is to be slag, two and one-half feet in depth. The pieces of slag will be one inch to five inches in diameter. The four beds will contain one and one-fourth acre-feet of material; and this area will undoubtedly purify the sewage of the present population to such an extent that it can be readily handled on the final sand filters. The discharge of the contact filters will be controlled by siphonic apparatus located in two chambers. One set of apparatus will control the two easterly filters and one the two westerly.

The sand filters are four in number, each approximately 200x60 feet

and containing a total area of one acre. The sand is to be three feet deep and the underdrains are to be about twenty feet apart. The sand will be underlaid by gravel. When the plant has reached its capacity, these filters will operate at a rate of 400,000 gallons per acre per day or 4,000 persons per acre. This is a reasonable rate considering the fact that the sewage will have been partially purified in the contact filters before applying it to the sand.

Both contact filters and sand filters are to be surrounded by earth embankments.

The State Board of Health, after considering the plans, as shown on drawings submitted by L. E. Chapin on August 29, 1907, approved the same September 24, 1907 upon the following conditions:

1st. That the sewage purification works be constructed before the proposed sewers are placed in use;

2nd. That chambers be placed at the inlet to each contact filter, so that apparatus for controlling the application of sewage may be readily installed if found necessary in the future; and that such apparatus be installed when deemed necessary by the State Board of Health;

3rd. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being placed in the filters; and,

4th. That the method of operation of the purification works be at all times satisfactory to the State Board of Health.

REPORT ON PROPOSED STORM WATER SEWER FOR PIQUA.

On April 16, 1907, a plan for a proposed storm water sewer in Caldwell and Camp streets, Piqua, was submitted to the State Board of Health by W. B. Mitchell, clerk of the board of public service. This plan was examined by the chief engineer of the Board and the following report was made:

The proposed storm water sewer is to drain an area of about twenty acres, and after crossing the Miami Canal is to discharge into the Miami River at the foot of Downing Street. The sewer is to be 20 inches at the upper end and 36 inches at the lower end. The total length will be about 2,000 feet. There are to be twenty-one catch basins, located at the street corners, draining into it. The size and the grade of the sewer appear to be satisfactory.

At a meeting of the State Board of Health, held April 24, 1907, this plan for a storm sewer in Caldwell and Camp streets, Piqua, was approved, provided the council of Piqua, before the sewer is constructed, pass an ordinance forbidding the tapping of this sewer for the purpose of admitting household waste of any kind, and that a certified copy of this ordinance be filed with the State Board of Health.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR ST. MARYS.

On January 9, 1907, The Riggs and Sherman Company, consulting engineers, submitted plans and specifications for proposed sewerage and sewage purification for the city of St. Marys. The engineer visited St. Marys for the purpose of obtaining information concerning certain features of the proposed work, and the following report was made:

St. Marys is a city of about 6,000 inhabitants, located in Auglaize County on the St. Marys River, a tributary of the Maumee River. The Miami and Erie canal passes through the city. The river below St. Marys flows in a northwesterly direction into the state of Indiana, and there are but two small towns located upon the stream before the Indiana line is reached.

Present Conditions. There are at present a large number of storm sewers at St. Marys which are probably used to a greater or less extent for domestic purposes and which discharge into the river at several different points. In addition there are several private sewers discharging into the river. It is claimed that the river is already polluted during dry weather by reason of the amount of sewage which it now receives. The necessity for sewage purification, therefore, with the new sewerage system is apparent.

In 1902 the State Board of Health approved plans for a sewerage system for St. Marys, provided sewage purification works were built at the same time the sewers were constructed.

In 1903 plans for a sewerage system, including sewage purification works, were approved by the State Board. These plans, however, have never been carried out. The reason for this it is said was because the contract for the work could not be let within the available funds, for the reason that the system was designed to operate by gravity and hence necessitated some very deep excavation.

It is of interest to note that the St. Marys River at this city is also polluted by wastes from a strawboard factory and that investigations showing the existence of this nuisance have been made by the State Board of Health.

Proposed Plans. The proposed plans call for a complete system of domestic sewers, draining the entire city. It is proposed to use the existing sewers for storm water after the proposed sewers are built.

Most of the lateral sewers will be 8 inches in diameter and the minimum grade will be 0.33 per cent. The main sewer will be 18 inches in diameter.

The sewage is to be collected at one point near the center of the city and discharged at a screening and pumping plant located near the present water works pumping station and electric light plant. This station con-

sists of a small sewage well or reservoir and pump pit, covered by a brick building. Two motor driven vertical centrifugal pumps will run continuously, under the constant supervision of the superintendent of the water works plant.

From this station the sewage will be forced through a 12-inch cast iron main to the purification works situated upon an area between the canal and the river, in the northerly part of the corporation and at least 1,000 feet from the nearest house. The location proposed is farther removed from town than the one approved by the Board in 1903. About ten acres are available for sewage purification purposes. The site is at such elevation that the plant may continue in operation during reasonably high stages of the river. The plant will be protected from excessive floods by dikes.

It is expected that as soon as the sewers as shown on plans are built, they will be used by 2,400 people. This number of people will probably yield about 250,000 gallons of sewage per day. The sewage purification plant for present installation has been designed on this basis. The strawboard wastes will not enter the sewerage system and no attempt will be made to treat them at the proposed plant. It would be unwise to do so for the reason that such wastes can be more economically treated by methods different from those employed for treating domestic sewage.

The method of sewage purification proposed is septic tank treatment followed by intermittent filtration through filters consisting of sand and gravel.

The septic tanks are two in number, each 12 feet wide and 60 feet long, with an average depth of 7½ feet, giving a capacity for each tank of 40,300 gallons or 7.7 hours' flow with both tanks in service, based on a daily yield of 250,000 gallons. The tanks will be of concrete and may or may not be covered. Considering the comparatively small size of the plant and the distance of the site from habitation, it would probably be of advantage for operating purposes to omit the cover.

Overflowing from the septic tanks, the sewage passes into a dosing chamber 15 feet square and having 3 feet effective depth, thus giving a dose of about 5,000 gallons. The design of the automatic controlling device has not yet been decided upon.

For present installation it is proposed to construct six filters, each 50 by 90 feet and having a total area of 0.62 acres. Based on a daily yield of 250,000 gallons, the rate of filtration will be about 400,000 gallons per acre per day. The population tributary per acre will be 4,000. This is excessive and it will probably be desirable to build a greater filtration area at the present time by enlarging the size of each bed.

The filtering material is to consist of sand and gravel. As at present shown on the plans, there is to be a 1-foot layer of sand underlaid by two 1-foot layers of gravel, but the consulting engineers state that they desire to adopt whatever suggestions the State Board of Health may

make regarding the nature of the material. The total depth of filtering material will be 3 feet.

In addition to the regular sand filters, there will be a sludge bed consisting of similar material, so located that the septic tanks may drain on to it by gravity.

At a meeting held January 23, 1907, the Board approved the plans for sewerage and sewage purification for St. Marys, as shown on drawings submitted by The Riggs and Sherman Company, consulting engineers, January 9, 1907, provided:

1st. That the sewage purification works be constructed before the proposed sewers are placed in use;

2nd. That detailed drawings of the controlling apparatus be submitted to and approved by the State Board of Health before installation;

3rd. That samples of the filtering material be submitted to the State Board of Health before being placed in the filters and that the proper thickness of each grade of material be determined by the State Board of Health when the quality of the material is examined;

4th. That when the daily flow of sewage shall reach 125,000 gallons the sewage purification works shall be enlarged in a manner and to an extent satisfactory to the State Board of Health; and,

5th. That the method of operation of the purification works be at all times satisfactory to the State Board of Health.

The Board also suggested that the grit chamber at the bottom of the pumping station be omitted.

REPORT ON CONTROLLING APPARATUS FOR THE SEWAGE PURIFICATION PLANT.

On March 19, 1907, in accordance with the second condition of the approval of the plans for sewerage and sewage purification for St. Marys, The Riggs and Sherman Company, consulting engineers, submitted detailed plans for the controlling apparatus. These were reported upon by the chief engineer as follows:

It is proposed to use the patented siphonic apparatus manufactured by the Pacific Flush Tank Company of Chicago. This apparatus is to be located in the dosing chamber, 15 feet square, which is suitably protected by a roof. There are six automatic siphons which discharge upon the sand filters. The sewage, rising in the dosing tank, causes the siphons to discharge automatically, in rotation, so that each filter is dosed in turn and with an equal amount of sewage. One or more siphons can be cut out when it is desired to dry and clean the filters.

This type of apparatus has been used at Geneva, Ohio, with considerable success; although it is necessary to have a competent man install and adjust it.

March 25, 1907, the Board approved of the controlling apparatus for

the sewage purification works for St. Marys, as shown on drawings submitted by The Riggs and Sherman Company, March 19, 1907.

At its meeting held April 24, 1907, the Board approved the plans and specifications showing the quality, size and depth of various grades of filtering material for the St. Marys sewage purification plant, submitted by The Riggs and Sherman Company on that date.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR SCIO.

January 18, 1907, The Riggs and Sherman Company, consulting engineers for the village of Scio, submitted plans and specifications for proposed sewerage and sewage purification for the village. After an informal discussion of the plans with the consulting engineer, amended plans were submitted on February 23, 1907. The chief engineer of the Board had visited Scio in reference to sewerage and the plans were referred to him for examination. The following report was made:

Present Conditions and Past Action of Board. Scio is a small village located in the oil region of Harrison County, having a population of about 1,200. The village is built on the two sides of a steep valley through which flows Connotton Creek, a small stream having a dry weather flow of less than a cubic foot per second. The valley is quite narrow at the upper part of the village but broadens out at the lower part.

There are at present two sewers, one on each side of the creek, through which a considerable amount of sewage is discharged. The outlet of one of these sewers has been the source of considerable complaint and a law suit.

Below Scio the creek flows through unoccupied country until Connotton, a small settlement four miles distant, is reached. Two miles farther on it passes through Bowerston, a village of six or seven hundred. The stream is said to be used, whenever it is not too badly polluted by oil, for stock watering purposes.

In August, 1903, plans for a sewerage system for a portion of Scio were submitted for approval. According to these plans the sewage was to be discharged directly into the creek, unless the Board required purification, in which case treatment in a septic tank and the discharge of the septic tank effluent directly into the creek was proposed. The principal sewer, according to these plans, was to be located in College Street.

In December, 1903, the Board considered these plans for sewerage for Scio and the following action was taken:

The approval of the construction of the College Street sewer and its discharge into the creek, until such time as in the opinion of the Board some other disposition of the sewage must be made.

The disapproval of the construction of any other part of the sewerage system, unless sewage disposal works are introduced at the same time.

The disapproval of the site chosen for the septic tanks on account of its being too near the village.

The requirement of a sewage purification plant when in the Board's opinion this becomes necessary.

In the early part of 1906 the mayor of Scio, Mr. J. E. Maughiman, requested approval of a proposed sewer in the northerly part of the village. The chief engineer of the Board investigated conditions at that time and found that a considerable complaint had been made on account of the discharge of sewage from the College Street sewer, discussed above, and that the establishment of any new outlets would be undesirable. The mayor was, therefore, notified informally that any plans for additional sewerage should include sewage purification works. The plans now submitted are apparently the outcome of this last investigation and communication.

Proposed Plans. The proposed plans provide for a system of strictly domestic sewers for the entire village, ranging from 8 inches to 10 inches in diameter. The main sewer will discharge at a sewage purification works located on land bordering Connotton Creek below the village. The site is 500 or 600 feet from the nearest houses, which is possibly somewhat nearer than is desirable. In order to secure a better site, however, a greatly increased expenditure would be necessary. It might be added that under present conditions any odors which might be created in treating the sewage, would probably be counteracted by the strong odor of oil which prevails in this locality. With such a small plant, therefore, there need be no objectionable odors if it is properly operated.

The sewerage system is designed to care for the entire population of the village, allowing for a substantial increase. It is expected that on completion of the system it will be used by not over 600 people; and it is probable that this figure will not be reached for some years. It is reasonable, therefore, to allow for immediate installation, sewage purification works of sufficient capacity to care for the sewage of 600 people. At 80 gallons per capita, this number of people would yield about 50,000 gallons per day.

The main sewer will discharge into a circular pump well, or reservoir, 20 feet in diameter and 30 feet deep, holding about 70,000 gallons. This well will be pumped out continuously, or at least during the daytime, by a centrifugal pump driven by a gas engine, to the sewage purification works to be located a few hundred feet from the pumping station.

The method of sewage purification proposed comprises septic treatment and filtration through filters consisting of one foot of sand overlying two feet of gravel. The septic tanks will be in duplicate. Each tank will be 8 feet wide, 60 feet long and about 6 feet deep, holding 21,000 gallons. Together they will hold twenty hours' flow at the beginning

and ten hours' flow when the daily flow has become 100,000 gallons. The septic tank effluent is to pass to a dosing tank from which it will be distributed automatically to the filters.

According to the drawings submitted, there would be for present installation, two filters, each 40 by 90 feet, and one filter 52 by 72 feet, thus giving an area of one-fourth acre.

Based on a population of 600 people connected with the sewers and a daily flow of 50,000 gallons, this latter area suggested would be amply sufficient to treat the sewage successfully. In view, however, of the proximity of houses to the disposal site, it would be desirable to construct and arrange the plant so that it will create as little odor as possible. To this end, the filters, instead of being operated upon the intermittent principle, should be operated on the contact principle; and the inlet should be so arranged that the sewage will not at any time appear on the surface of the filters.

March 6, 1907, the Board approved these plans, as shown on drawings submitted January 18 and February 23, 1907, provided:

1st. That sewage purification works be built before any of the proposed sewers are placed in use, and that all existing sewers be connected with the proposed system;

2nd. That the purification works be enlarged in a manner satisfactory to the State Board of Health whenever such enlargement is deemed necessary by said Board;

3rd. That the management and care of the purification works be at all times satisfactory to the State Board of Health;

4th. That the filters be operated upon the contact principle and the sewage be discharged into the filter at an elevation immediately below the surface. This will make the wooden distributors, shown on plans, unnecessary.

5th. That detailed drawings showing dimensions of dosing tank and controlling apparatus be submitted to and approved by the State Board of Health; and,

6th. That samples of the filtering material be submitted to the State Board of Health before being placed in the filters and that the proper thickness of each grade of material be determined by the State Board of Health when the quality of the material is examined.

The authorities were also advised that the Board was of the opinion that it would be better for ultimate use to locate the sewage purification works much farther down the valley, away from habitation.

REPORT ON PROPOSED SEWER IN DOCK STREET, STEUBENVILLE.

On April 23, 1907, the city engineer of Steubenville, Mr. S. B. Curfman, submitted a plan for a proposed combined sewer in Dock Street,

to discharge into the Ohio River. In anticipation of this plan being submitted, the chief engineer of the Board visited Steubenville on April 19, 1907, to make the necessary inspection. The following report was made:

That portion of Dock Street to be sewered is located in the north central part of the city and extends from Sixth Street to the Ohio River. Lateral sewers will enter the proposed Dock Street sewer at Third, Fourth, Fifth and Sixth streets. The district to be thus drained covers approximately twenty-two acres. All of the streets are paved and about one-third of the lots in the district contain residences. The present population is estimated at 200 with an ultimate population of 700.

The sewers in this district are to be on the combined plan and all the catch basins are to be trapped. This is consistent with the general practice in Steubenville, as the time for the necessity for sewage purification is probably far distant. When this time comes, the present combined lateral sewers can still be used as domestic sewers, so that it will be necessary to build only the main domestic sewers in order to separate the sewage.

The total length of the proposed sewers is about 2,000 feet and they are from 12 inches to 24 inches in diameter. The outlet at the foot of Dock Street, for the dry weather flow will consist of a 12-inch cast iron pipe carried below the low water of the river, while the outlet for the combined flow will be at the top of the bank. The latter outlet will be used only when there is great dilution of the sewage.

The Board has within the past two years approved sewers for two districts in Steubenville very similar to the Dock Street District, although in one case there was a continuous flow of spring water through the sewer, which tended to prevent deposits and odors.

At a meeting held April 24, 1907, the State Board of Health considered the plan for a proposed combined sewer in Dock Street, together with laterals in Third, Fourth, Fifth and Sixth streets, as shown on drawings submitted by the city engineer April 23, 1907, and the same was approved.

REPORT ON PROPOSED SEWERAGE FOR THE CLINTON AND THIRD STREET DISTRICT, STEUBENVILLE.

In July 12, 1907, there were received from Mr. S. B. Curfman, city engineer of Steubenville, plans and information regarding proposed sewers in the Clinton and Third Street District. The chief engineer visited Steubenville on July 25, 1907, and made an inspection of the territory in question. The following report was made:

The Clinton and Third Street Sewer District covers an area of about thirty-seven acres and is located in the northerly part of the city. This district is occupied entirely by residences, about one-third of the lots being

covered with buildings. The estimated population at the present time is somewhat over 1,000, and it is expected that the ultimate population will be 2,000. The dry weather flow of sewage to be expected from this district, therefore, is somewhat less than 100,000 gallons per day.

The proposed sewers have a total length of about one-half mile and range in size from twelve inches to thirty-six inches in diameter; all have excellent grades. The quantity of storm water sewage for which the system is designed is two million gallons per day and is based on a 2-inch rainfall per hour over the entire district. The steep grade of the streets, however, will prevent all of the surface water from reaching the sewers. The outlet of the district is to be into the Ohio River at the corner of Third Street and Madison Avenue.

Within the last two or three years the State Board of Health has approved sewerage for several districts in Steubenville of about the same size and character as the one now under consideration. In designing all these sewers, the city engineer has in mind the ultimate building of an intercepting sewer to convey the entire output from the city to a point below town. This would be comparatively easy with the topography which exists at Steubenville.

The proposed outlet now under consideration is two or three miles down-stream from the water works intake. Although no definite information is given on the plans, it is presumed that the outlet will be constructed in the same manner as those recently built, i. e., that the dry weather flow of sewage will be conveyed below the low water level of the river by means of iron pipe. This prevents fouling the banks of the river.

August 6, 1907, the Board approved the plans for proposed sewerage for the Clinton and Third Street District, as shown on drawings submitted by the city engineer July 12, 1907, provided that the main outlet be so constructed that the dry weather flow will be conveyed below the lowest water level of the river at all times.

REPORT OF PROPOSED STORM WATER SEWERAGE FOR SYLVANIA.

The clerk of the council of Sylvania, W. B. Harris, on May 16, 1907, submitted a plan for a storm water sewerage system for that village, drawn by L. T. Owen, consulting engineer, of Toledo. The chief engineer visited Sylvania on May 23, 1907, to make an inspection of the ground, and the following report was submitted:

Sylvania is a village of about 800 population, located in Lucas county some twenty miles northwest of Toledo. It is situated at the confluence of the north and south branches of the Ottawa River, or Ten Mile Creek, which flows through the city of Toledo.

At the present time there are no sewers of any kind in Sylvania, with the possible exception of a few private drains. The village is not thickly settled and privies are in general use.

The reason for installing a system of sewers is to provide drainage for cellars and for surface water. There seems to be no intention to use them for water closet wastes.

The proposed system consists of the following: 975 feet of 30-inch pipe; 825 feet of 24-inch pipe; 1575 feet of 18-inch pipe; 3440 feet of 15-inch pipe; 3620 feet of 12-inch pipe, and 3180 feet of 10-inch pipe. The system proposed provides drainage for practically the entire village. About 1,000 feet will be constructed in the immediate future. The sizes and grades of the sewers appear to be ample for providing satisfactory drainage.

At a meeting, held June 12, 1907, the Board approved this plan, provided that the village council first pass and file with the State Board of Health an ordinance forbidding the tapping of all sewers shown on this plan, or any future sewers tributary thereto, for the purpose of admitting water closet wastes, sink drainage or household wastes of any kind.

REPORT ON PROPOSED RELIEF SEWER FOR DISTRICT NO. 16, TOLEDO.

December 5. 1906, plans for a proposed relief sewer for District No. 16 were received from the city engineer of Toledo, Mr. F. I. Consaul. These plans were considered by the Board at its meeting on January 23rd, 1907, and were referred to a committee, consisting of the resident member and the chief engineer, for investigation and report. February 5, 1907, this committee made an investigation of the location of the proposed outlet and of the territory involved and reported as follows:

Sewer District No. 16 of the city of Toledo is located in the north-central portion of the city immediately south of the Ottawa River. The district covers about 850 acres, containing the best class of residences in the city. Most of the streets in this district are paved and the easterly portion of the district, at least, is quite thoroughly sewered. The total population of the district is approximately 6,000 people. The main sewer from this district discharges into an estuary of the Ottawa River at a point northwest of the junction of Manhattan Road and Blanchard Street. This sewer is 72 inches in diameter at its lower portion and on the combined plan. It was built before the State Board of Health had jurisdiction over proposed sewer outlets.

Within this district there is a small sub-district (No. 1), covering 30 acres and located immediately south of the intersection of Detroit

Avenue and Ottawa River. This sub-district has a main outlet some 24 inches in diameter, which was approved by the Board in 1903.

The large main sewer of District No. 16 having become too small at times of continued heavy rains, it is now proposed to construct a relief sewer, which will intercept some of the existing lateral sewers now entering the present main, and which will also serve as an outlet for new sewers in the westerly portion of the district, which will probably soon be constructed. It is proposed to construct this relief sewer, as is the usual custom in Toledo, on the combined plan. The proposed outlet is to be into Ottawa River at the Detroit Avenue bridge. This avenue is a main thoroughfare and there is much passing over the bridge, and it would, therefore, be an undesirable place for the sewer outlet even if the discharge of sewage into Ottawa River at any point were justified.

The Board disapproved these plans February 25, 1907, and offered the following advice:

"The construction of necessary additional sewerage for District No. 16 along entirely different lines from those proposed. Instead of a single combined sewer, it would be much more desirable to construct two distinct systems, one for storm water and one for domestic sewage. The storm water sewer could then, without offense, be discharged at the foot of Detroit Street; while it would be necessary to extend the domestic main sewer to a suitable location for sewage purification works and there purify it. If the domestic sewers are built at the same time as the storm sewers, the increased expense will not be excessive for the reason that the former can probably be built of sewer pipe from 8 to 18 inches in diameter and in general be laid in the same trenches with the storm sewers. As the present main sewer of District No. 16 is overloaded at times of storms, it would probably be permissible to allow the sewage from this present main sewer, when greatly diluted with surface water, to overflow into the above suggested storm sewers."

REPORT ON PROPOSED SEWERAGE FOR A PART OF THE EXTENSION OF THE BAILEY ADDITION TO WEST TOLEDO.

Application was made for the Board's approval of a proposed sewer for a part of the extension of the Bailey Addition to West Toledo, located in Caroline Street, December 28, 1906. This was accompanied by a sketch made by Mr. Wm. H. Gould, consulting engineer.

The matter was considered by the Board at a meeting held January 23, 1907, and was referred to a committee, consisting of the resident member and the chief engineer. On February 5th the committee made

an investigation of the location of the territory involved and reported as follows:

The extension of a part of the Bailey Addition comprises a piece of unimproved land which has recently been platted. The proposed sewer is 1880 feet long and is located in Caroline Street, so-called. The principal reason for putting it in is to provide drainage for the cellars of houses which it is expected will be built along this street, as soon as the lots are sold. There is at present only one house which it is desired to connect. In addition it will take surface drainage from a small area of low ground and will receive the overflow from rainwater cisterns.

The sewer is to discharge into Sibley Creek, a small intermittent stream, which enters Ottawa River opposite the exterme northerly portion of the city of Toledo. This small stream has in the past, at times, been the cause of complaint on account of its pollution from private drains.

The only objection to the proposed sewer, therefore, is the possibility of its use for domestic purposes. It is believed, however, that a suitable agreement can be made between the State Board of Health and the owner, Mr. Alfred Bailey, by which the use of the sewer for this purpose can be restricted.

February 25, 1907, the Board approved this sewer, as shown on sketch submitted by Mr. Wm. H. Gould, consulting engineer, December 28, 1907, provided Mr. Bailey sign an agreement whereby there be placed in the deed of any land which may be sold by him in the future, the stipulation that, until provision satisfactory to the State Board of Health has been made for purifying the contents of this sewer, the purchaser shall not use the sewer in Caroline Street for any purpose whatsoever except to drain the ground water which naturally filters into the cellars, the overflow from rainwater cisterns, and uncontaminated surface water.

Such an agreement was received from Mr. Alfred Bailey, March 4, 1907.

REPORT ON SEWAGE DISPOSAL AT "WHITE CITY," TOLEDO.

On May 28, 1907, the Toledo member of the State Board of Health, and the chief engineer of the Board made an inspection of the "White City," near Toledo, with reference to disposal of the sewage from that place. The following report was submitted:

The "White City" is an amusement park, covering an area of forty of fifty acres, located on both sides of the Ottawa River, or Ten Mile Creek, near the westerly boundary of the city of Toledo, part of the area being within the city. The park, which is just about completed, is very well equipped with all the modern schemes for entertaining the people. It is expected that the attendance on certain days will be as

great as 20,000 or 30,000, while the average daily attendance will be from 3,000 to 5,000.

The water supply for the park is to be derived from a driven well from which the water will be drawn by means of a centrifugal pump and raised into an elevated tank.

The sanitary conveniences consist of one main water closet for the men and one for the women. In addition there is an extra water closet in the dance hall. These closets all contain modern plumbing and are provided with automatic devices by which generous quantities of water are used for flushing. The two main closets are located upon a 6 or 8-inch sewer line which discharges into Ten Mile Creek immediately above the easterly boundary of the park. The dance hall water closet has a special pipe discharging into the creek a few hundred feet above this point.

As the flow of the creek in summer time is very low, the discharge of sewage as proposed will undoubtedly create very offensive conditions, not only within the limits of the park but along the course of the stream within the city limits below the park. This would be especially undesirable as the Board has recently disapproved new sewer outlets into this same stream in this vicinity.

In order to obtain satisfactory conditions at the "White City" the sewage from all closets should be drained into a covered cess-pool, holding 5,000 to 10,000 gallons, and pumped intermittently to a suitable disposal area. The sewage could undoubtedly be handled by a 3-inch or 4-inch centrifugal pump and a 3-inch force main. Probably the most desirable method for purifying the sewage would be sand filtration covering an area of not more than one-half acre.

At a meeting held June 12, 1907, the State Board of Health disapproved the method proposed, of disposing of the sewage of the "White City" by discharging it unpurified into Ten Mile Creek, and the authorities were notified that they should install means for purifying the sewage before discharging it into the creek, and that plans for such purification works should be submitted to and receive the approval of the State Board of Health before being carried out.

REPORT ON PLANS FOR PROPOSED SEWAGE PURIFICATION FOR WADSWORTH.

The consulting engineer of Wadsworth, Mr. John W. Holl, of Canton, on April 22, 1907, submitted plans showing in a general way a proposed sewage purification scheme for that village. The chief engineer examined the plans and the following report was made:

Plans for sewerage and sewage disposal, prepared by Snow and Barbour, were approved by the State Board of Health in 1903. About one and

one-half miles of sewers, in accordance with these approved plans, have been constructed, but these sewers have not yet been placed in use, because purification works have not been built.

Instead of carrying out the approved plans for sewage purification by intermittent filtration, the present engineer for the village desires to install contact filters supplemented by sand filters; the latter to be used at a high rate of filtration. This change is requested for the reason that the price of sand has increased very greatly since the works were first designed in 1903.

The scheme now submitted for approval, therefore, comprises four septic tanks, each having a capacity of 15,000 gallons, and six contact filters in groups of three. Each filter has an area of 0.04 acre and on a basis of 33 percent. voids in the filtering material, will hold 18,000 gallons. The contact filters are 5 feet deep. The sand filters are four in number, each 20 feet square, giving a total area of 1,600 square feet.

Based on a population contributing sewage of 2,500 and a flow of sewage of 200,000 gallons daily, the contact beds would operate at a rate of two cycles per day, and the sand filters at a rate of about 5,000,000 gallons per acre per day.

The rate on the sand filters is entirely too great even for contact filter effluent. The area of these filters should therefore be enlarged.

At a meeting of the State Board of Health, held April 25, 1907, the general scheme for sewage purification for Wadsworth, as shown on drawing submitted by John W. Holl, consulting engineer, was approved provided the total area of the sand filters be increased to 8,000 square feet; that is, that each filter be 33 feet square instead of 20 feet square.

The Board also approved the installation of one-half of the plant at the present time.

The authorities were notified that before final approval was given, full detail plans of the works, in accordance with the standard directions of the State Board of Health, should be submitted to the Board for further consideration.

These detailed plans were submitted June 18, 1907. The chief engineer reported that the information contained on the detailed plans was consistent with that shown on the general plans mentioned above; that the plans had been amended in accordance with the conditions of approval given April 25, 1907. The choice of filtering material was left until the time of placing this material and the automatic distributing apparatus had not been chosen, but it was stated that this would be either that manufactured by Merritt and Company or by The Pacific Flush Tank Company.

July 1, 1907, the Board approved the plans for proposed sewage purification for Wadsworth, as shown on drawings submitted by John W. Holl, consulting engineer, April 22 and June 18, 1907, provided:

1st. That the management of the plant be at all times satisfactory to the State Board of Health;

2nd. That samples of all filtering material be submitted to and approved by the State Board of Health before being placed; and,

3rd. That plans of the automatic controlling device, when selected, be submitted to and receive the approval of the State Board of Health before such apparatus is placed.

The board of trustees of public affairs was also notified that the site for the sewage purification plan was not entirely satisfactory on account of its proximity to two small houses and was approved by the State Board of Health in 1903 with the idea that these houses would be included in the property to be purchased for sewage purification purposes.

August 5, 1907, there were received from John W. Holl, consulting engineer for Wadsworth, plans showing the proposed change of site for the sewage purification works already approved. The changed location or new site was 500 or 600 feet farther removed from habitation than the site first considered and therefore more desirable.

The Board approved this change of site August 16, 1907.

REPORT ON A SEWERAGE SYSTEM FOR WEST MILTON.

On December 13, 1906, the assistant engineer visited West Milton for the purpose of making a general examination in connection with the installation of a new sewerage system. The following report was made:

West Milton is a village of about 1,500 population, in the southwest portion of Miami County and on the west bank of the Stillwater River. The area within the corporation limits is about 0.85 square mile. The surrounding country is mildly undulating and has a general slope toward the river. Back of the village this slope is gentle, but from the village to the river bank, an average distance of 800 feet, the fall is from 80 to 100 feet. The neighboring country is underlaid with limestone which comes to within a few feet of the surface.

The village appears to be very progressive, the streets and house lots are clean and neatly kept. The public water supply, at present in use, is obtained from a spring under a farm house just west of the village. This supply, while at present free from injurious pollution, is liable to future contamination and samples of it should be frequently submitted for analysis.

There are no industries in West Milton to speak of, and the population is made up mostly of farmers and merchants.

The assessed valuation of the village for 1905 was $518,317, the tax rate being 30.1. The public debt at the present time is in the neighborhood of $29,000, which, with the present assessed valuation, would per-

mit the issuing of bonds for new public improvements to the extent of about $11,000.

It having come to the attention of the State Board of Health that a number of sewers had been constructed in West Milton without having first submitted plans to the Board for approval, an investigation was made by the assistant engineer June 7, 1906, and his report showed that five sewers had been constructed, all of which had separate outlets into the Stillwater River. These outlets as a rule discharge on the banks some distance from the water's edge, resulting in the fouling of the banks to a considerable extent. So far as could be learned the sewers were well constructed of vitrified pipe laid with cement joints.

A copy of the report of the assistant engineer was sent to the board of trustees of public affairs and their attention called to the fact that the sewers had never been approved by the State Board of Health, as required by law, and that the report indicated that the sewers were already giving trouble because the outlets did not extend into the stream, permitting the discharge of filthy material upon the banks. They were advised that with but little extra expense these outlets could be extended into the current and submerged, but that it would be better for the village, before undertaking any extension of its sewers, to call to its aid some competent engineer and have him prepare a comprehensive sewerage system for the entire village, which should provide for collecting the sewage at some point below town, where it could be properly purified when this becomes necessary. They were also advised that, as the present outlets had not been approved by the State Board of Health, any plans for the extension of the sewers discharging from them should be submitted to the State Board of Health for approval.

In accordance with a suggestion made in the letter to the board of trustees of public affairs, the services of John W. Dowler, consulting engineer, of Covington, Ohio, were retained to design a complete sanitary sewerage system for the village; such system to have a single outlet into the Stillwater River at such place and at such elevation that a sewage disposal plant may be installed in the future when the village has attained such size as to render the discharge into the river of the increased quantity of sewage in a crude state objectionable. The system is not to be built entirely at present, but added to from time to time as required by the needs of the village.

The plans, which were submitted January 15, 1907, by the consulting engineer, Mr. Dowler, propose the construction of an intercepting sewer, 12 inches in diameter, extending the whole length of the village and following in a general way the slope which lies between the built up portion of the village and the river and having an outlet into the river near the down stream end of the village. The interceptor is to be maintained at an elevation such that in the future a purification plant may be installed on a plot of level ground near the outlet. The available head for

passing through this purification plant is about 11 feet when the river is at its medium stage; at extreme high water the available head would be in the neighborhood of 5 feet only, in which event it would be necessary to discharge crude or septic sewage into the river. As the flow of the river at this point at high water is quite large (in the neighborhood of 5,000 cubic feet per second), this procedure would not be objectionable.

As indicated by the specifications, the entire sewerage system is to be constructed of vitrified sewer pipe well laid with manholes or lamp-holes at all changes in grade or direction. The existing sewers are to comprise a part of the system and additional sewers are projected for parts of the village as yet unsewered. As indicated on the profile, the sizes and grades of the proposed sewers are ample to care for any reasonable flow to be anticipated from future increase in population.

At a meeting of the State Board of Health, held January 23, 1907, these plans for a sewerage system for West Milton, as shown on drawings submitted January 15, 1907, by John W. Dowler, consulting engineer, were approved provided that sewage purification works of a design satisfactory to said Board be installed and operated when this is deemed necessary by the State Board of Health.

MISCELLANEOUS REPORTS.

REPORT ON PREVALENCE OF TYPHOID FEVER IN CONNEAUT, BETWEEN NOVEMBER 29, 1906, AND APRIL 2, 1907, WITH SPECIAL REFERENCE TO ITS CAUSATION BY THE PUBLIC WATER SUPPLY.

On March 22, 1907, a letter was received from Dr. O. N. Warner, health officer of Conneaut, stating that an unusual prevalence of typhoid fever existed in that city and requesting an investigation by the State Board of Health. Accordingly, on April 1, 1907, the special assistant engineer in charge of the investigation of the filtration of water supplies and the assistant engineer visited Conneaut. The former investigated the operation of the filtration plant for a period of five days, and the latter spent six days in a study of typhoid fever conditions existing throughout the city. The following joint report was submitted:

The city of Conneaut is located in the extreme northeastern portion of Ashtabula County, on Lake Erie and adjacent to Conneaut Creek. The area of the city within the corporation limits is approximately 2.49 square miles, and the population is about 10,000. The growth of the city is rapid, the population having nearly doubled within the past ten years. Conneaut lies on rather level ground, excepting near the creek which flows at about 40 to 50 feet below the general level of the city; the banks of the creek are generally steep. The soil in and about Conneaut is of a stiff clay which drains poorly. The city is primarily an ore handling port and during the last few years has attained considerable importance as such. It also contains large railroad shops and a few other minor industries. The general sanitary conditions of Conneaut are somewhat better than one would expect to find in a community with such a large foreign population. Most of the foreigners are Scandinavians, Hungarians and Italians. All are of the somewhat better classes. Many are scrupulously neat and clean within their houses but are less particular about the outside surroundings. The city contains may well paved streets but there is still room for much improvement in this direction.

The sewerage system is on the separate plan, is well constructed, covers the principal portions of the city and is being rapidly extended. The sewers were approved by the State Board of Health during 1900, with the condition that the sewage be purified before discharging into Conneaut Creek, whenever in the opinion of the Board this becomes necessary. A large number of houses are not connected with the sewerage system; hence, there are many outdoor privies in use. Nearly all of the houses not connected with the sewers are provided with the public water supply, giving rise to a considerable amount of sink drainage improperly cared for. This is usually discharged either over the surface of the

ground or into inadequate ditches where the water stagnates and in warm weather undergoes putrefaction. In certain localities this practice results in a very unsanitary condition of affairs. The sewers still discharge the sewage in a crude state into Conneaut Creek, from whence it finds its way into the lake and under certain conditions over the water works intake. Owing to the small flow of the creek at times of low water, large quantities of sewage accumulate in and near the channel of the stream. At times of sudden rises in the creek, these accumulations are rapidly washed toward the lake and with wind conditions favorable, are carried in large quantities over the water works intake. Analyses of water from the mouth of the creek gave abundant evidence of pollution.

The removal of garbage and refuse in Conneaut is but very imperfectly carried out. From the better districts it is removed outside of the city limits by private parties and dumped where convenient. In those portions of the city principally inhabited by foreigners, it is frequently dumped in back yards, gullies, and in many other places near habitations where it may readily give offense. This is notably so in case of a drainage ditch or gully which carries surface wash from that portion of the city near the lake to a point just west of the pumping station. Under ordinary dry weather conditions the water from this gully sinks into the sand of the beach, but in times of storms it flows out into the lake and is frequently carried over the water works intake. The character of the flow in this gully has been somewhat improved with the introduction of the sewerage system, but it still receives considerable drainage from privies and the washings from refuse heaps which are dumped into and near it.

PUBLIC WATER SUPPLY, FORMER TYPHOID EPIDEMICS, AND INVESTIGATIONS BY STATE BOARD OF HEALTH.

The public water supply was first installed in 1891. A franchise was granted by the city to the water company, June 16, 1890, for a period of twenty years, reserving to the city the right to purchase the plant after periods of ten, fifteen and twenty years. The following provisions regarding the source of supply were also included in this franchise:

> "The supply shall be ample for all the wants of a place of 10,000 inhabitants, and the water shall be taken from Lake Erie or from filtering galleries, wells or reservoirs built on the shore of said lake, in either case, in such manner as shall furnish a complete and ample supply of good pure water as aforesaid; and if taken directly from the lake, the water shall be filtered or clarified in settling basins in such manner as shall make the same pure, clear and wholesome, and no reservoir other than those situated near the shores of said lake, including one from which the water is pumped shall be used in the operation of said works, and the water shall be taken from a point not less than 2,000 feet westerly of the west pier at Conneaut harbor."

The water works soon proved a failure as a business venture, and

a few years later they were placed in the hands of a receiver under which management they have remained to the present time.

Examination of Public Water Supply in 1898. The first examination of the public water supply by the State Board of Health was made in 1898. The water was then derived from eight tubular wells driven horizontally under the lake a distance of 20 to 30 feet. The wells were provided with Cook strainers, and also with a 10-inch cast iron pipe extending some distance out into the lake and through which lake water could be drawn directly. This latter was originally intended for emergency use only, but at the time of the examination the valve was kept partially open. It was found that the wells even though they could be back-flushed under stand-pipe pressure, were insufficient, owing to rapid clogging of the strainers, for furnishing all the water required for the needs of the city.

Epidemic of 1899. In 1899 there occurred an outbreak of typhoid fever which was investigated by the secretary of the State Board of Health. This epidemic began in April and lasted until October. In all there were ninety-four cases and twelve deaths, distributed as follows:

April and May	12 cases.	2 deaths.
June	8 "	2 "
July	3 "	1 "
August and September	66 "	6 "
October to the 5th	5 "	1 "
	94 cases.	12 deaths.

All but ten of the cases used the public water supply. In portions of the town where well water only was being used, there were no cases at all. Analyses made of the public water supply showed that it varied but little from the lake water and also showed the presence of the colon bacillus. From the above figures it will appear that during this year there was a very alarming amount of typhoid fever, and the death rate, 178 per 100,000, (see Table of Vital Statistics) was as bad as found in the most typhoid ridden cities in the country.

Installation of Filtration Plant. Upon recommendation of the State Board of Health, the water company installed a mechanical filtration plant, consisting of two Jewell gravity filters with coagulation compartments, each having a nominal capacity of 400,000 gallons per day. Plans for the filtration plant were submitted to the Board for approval, which was granted unconditionally November 23, 1899. After the installation of the filters, conditions relative to typhoid fever were somewhat improved, but that the filters were not a perfect safeguard against the recurrence of the disease was shown by the outbreak of typhoid fever in 1901.

Epidemic of 1901. This epidemic was investigated on April 26th of that year by the engineer of the Board, who in the course of a general

examination of public water supplies throughout the state, found typhoid to be prevalent at Conneaut. From the 1st to the 26th of April there had been twenty-five cases and two deaths. An investigation of the filtration plant showed that the supply of alum had become exhausted, and on March 18th, 19th and 20th there had been no alum used.

Epidemic of 1902. In February and March of 1902 another epidemic occurred which was also investigated by the engineer of the Board During this epidemic there occurred sixty-four cases, three of which were fatal. The cause assigned for this outbreak was the inefficiency of the filters brought about by the insufficient use of alum. It was stated in the report that the alum was varied with the turbidity of the water and that until March 18th there had been but one-fourth grain per gallon used. This, in the light of recent investigations, is entirely too small an amount to secure efficient results.

Water Works at the Present Time. The following is a description of the water works as they exist at the present time. In order to make the description as readily followed as possible, the water will be traced in its course from the intake through the pumps, filters and accessories. The water is taken through an intake tunnel of brick, 4 feet in diameter and extending into the lake a distance of about 1,500 feet The outer end of the tunnel is in about 15 feet of water. Rising therefrom is a cast iron intake pipe which permits the water to enter about 5 feet above the lake bottom. The intake pipe is provided with a screen and is protected from ice action by a submerged wooden crib. At the shore end the tunnel enters a brick lined receiving well about 7 feet in diameter and 40 feet deep. A cast iron suction pipe from this well leads to the raw water pump. Into this suction the coagulant is introduced. The coagulent mixing plant consists of two large wooden tanks, each having a capacity of about 2,000 gallons, which are used alternately for preparing the alum solution. From either or both of these tanks the solution is passed through an orifice box which is provided with a float valve that maintains a constant head of water over the outlet, the outlet having a free discharge. This arrangement causes a nearly even flow of coagulant. From the orifice box the coagulant solution flows by gravity into the pump suction, as above described. The water containing the coagulant passes from the pump to the filters which are three in number. The two older filters, which constitute the original installation, are of the Jewell type, and the one more recently added was built by the Pittsburgh Filter Manufacturing Company. All of the filters are of wooden tub construction.

The Jewell filters are of an old type and have net filtering areas of 175.9 and 180.7 square feet, respectively. One of these filters may be described as a smaller tub, 15 feet in diameter by 6 feet in height, placed within a large tub, 16 feet in diameter by 15 feet in height, and supported near the top of the latter so that the rim of the smaller will be about 2

feet below the rim of the larger. The annular space between the two tubs is closed near the bottom of the smaller tub and made water-tight. Water from the pump enters the large tub in the space below the small tub, where it is given a short period for coagulation (approximately fifteen minutes at normal rate of operation). From the coagulation chamber the water passes upward through a 12-inch pipe placed vertically through the center of the small tub, the latter being the filter proper. The filtering material consists of a bed of fine quartz sand about 40 inches in thickness, the grains being of nearly uniform size. The sand thus comes to within about 15 inches of the rim of the small tub. The sand bed is underlaid by a strainer system for collecting the filtered water. This consists of a series of lateral pipes about 1½ inches in diameter, laid at intervals of about 6 inches. These smaller pipes enter main collectors which carry the water to the effluent pipe. Tapped into the laterals at intervals of 6 inches, are brass strainers or screens with perforations of such size as to permit the water to flow through them but to prevent the entrance of sand grains. The water passing upward through the central pipe, spreads out over the filter and passes downward through the sand. For efficient filtration it is necessary to maintain some depth of water above the sand, generally several feet. This was not regularly done until the present special investigations were begun. An effluent pipe draws the filtered water from the strainer system at the bottom of the small tub, this effluent pipe being controlled by a gate valve. The filtered water is discharged into a filtered water flume, loosely boarded over and passing under the filters. In order to get the best results in rapid sand filtration, the effluent pipe should be provided with an automatic controlling valve which will permit the effluent to pass only at a certain fixed rate. This secures an even filtration and prevents excessive rates. This control is now improperly obtained by partially opening the gate valve controlling the effluent pipe when the filter is clean and from time to time, when the surface of the filter becomes clogged, giving a few more turns to the valve. In order to ascertain what rate of filtration is being obtained at any particular time, it is necessary to shut off the valve controlling the influent pipe and measure the rate at which the water on the surface of the filter drops. The greatest defect in this hand control arrangement of the filters is the temptation to speed them when more water is required, and in general the uncertainty of the rate unless the filters are constantly watched. After a period of filtration the filters become clogged with coagulant and dirt and it becomes necessary to clean them. In order to indicate when it is necessary to wash, the filters should be provided with loss of head gages which register the amount of head lost by the water in passing through the sand. When the filters are clean this loss of head will be about 18 inches, and when requiring washing will be from 9 to 10 feet. Above this, efficient filtration can rarely be obtained in practice. The filters at Conneaut are not

provided with such devices and the time for washing rests with the judgment of the man in charge; under such circumstances the filters are usually not washed until they fail to give the required amount of water. Washing is accomplished by shutting the influent and effluent valves and admitting filtered water from the main into the strainer system. This reverses the flow of water through the filters. The rising current causes a "liquefaction" of the sand; that is, it causes the grains of sand to separate and in their agitation to be relieved of adhering coagulant and dirt. The agitation of the sand is assisted by mechanical rakes with iron fingers reaching to a depth of about 18 inches below the normal surface of the sand. These rakes are driven from a line shaft operated by a steam engine. The soiled wash water from the surface of the filters overflows the rim of the smaller tub and passes into the annular space between the two tubs, from whence it is conducted by a pipe to the wash water drain. This drain within the filter house is an open flume similar to that for clear water and is placed adjacent to it. From the building the soiled wash water is conducted by means of a wooden conduit to the lake. When the water at the surface of the filter during washing becomes comparatively clear, washing is discontinued and filtration resumed by simply reversing the valves.

The third filter, built by the Pittsburgh Filter Manufacturing Company, is the same in general operation as the two Jewell filters but is not provided with a coagulation compartment in which the coagulation process may be completed. In place of the annular space between the two tubs for carrying off soiled wash water, an overflow trough of steel plates is provided. This trough serves to admit and distribute the influent, and hence also takes the place of the central pipe of the Jewell filters. The Pittsburgh filter is equipped with a valve and float arrangement which is supposed to control the rate of filtration, but it is wrong in principle and really performs no useful function. In the Jewell filters the short period of coagulation gives time, at least in warm weather, for a good flocculent precipitate to form before the water passes on to the bed of sand. In the Pittsburgh filter, however, this is not the case as the water comes directly from the pump to the filter, and it has been noted that the flock is very small and the process of precipitation is apparently incomplete. This not only tends to produce a poorer effluent but also causes the filter to clog more rapidly by the formation of a precipitate in the interstices of the sand. The strainer system is essentially the same as that in the Jewell filters, though the brass strainers or screens are somewhat different in design.

The drain for soiled wash water, as noted above, is uncovered within the building and is adjacent to the flume for collecting the filtered water. When on account of wind storms the lake level rises to an unusual height, the water backs into the drain, causing it to overflow into the flume carrying the filtered water. This has occurred several times. At

present such an occurrence is guarded against by placing a wooden plug, rapped with burlap, into the drain pipe where it enters the wall of the building. Lake water backing up into the drain has a further disadvantage in that it prevents the washing of the filters for considerable periods of time.

The filtered water flume discharges into a clear water well divided into two compartments. The water enters the first compartment and overflows a dividing wall into the second compartment. The main supply pump which delivers water into the distribution system, takes its suction from near the bottom of the second compartment. The available storage capacity of this basin is capable of supplying the city with water, under ordinary conditions of consumption, for about nine minutes, which indicates an absurdly small storage capacity. Thus if the filtered water pump speeds up, the clear water basin will soon be emptied unless the filters are operated at an exceedingly high rate. On the other hand, if the filtered water pump runs too slowly, the filtered water basin is likely to overflow, causing a considerable waste of filtered water. When one filter is being washed, it is necessary to operate the other two filters at an excessively high rate, with danger of causing an imperfectly purified effluent. Since the recent investigations of the State Board of Health, this is to a certain extent overcome by slowing down the filtered water pump and relying on the standpipe to tide over the period of washing. During the day, when the supply is being drawn upon rather heavily, the utmost care and watchfulness is required on the part of the attendants. It is necessary for both raw water and filtered water pumps to be operated at the same and a nearly constant rate, and this rate must not exceed that at which the water may be passed through the filters. Fortunately the large standpipe in the distribution system provides sufficient storage to cover the greatest of the irregularities in consumption.

From the foregoing it will be seen that the filtration plant is imperfect in design and construction, that high efficiencies can only be obtained by the most careful and expert attendance, and that any irregularities in its operation are liable to permit an imperfectly purified water to enter the mains. Such irregularitties may occur in a variety of ways and at most any time.

SUMMARY OF PREVIOUS TESTS MADE IN CONNECTION WITH SPECIAL INVESTIGATIONS.

The following is a brief summary of each of the tests made in connection with the special investigation of filtration plants:

Test of June 19-22, 1906. This examination brought out forcibly the lack of knowledge, on the part of those in charge of the water works, relative to the operation of the filtration plant. The conditions under which the filters were working were entirely incompatible with the production of a safe effluent. Among the irregularities in operation observed were the following:

The rate of filtration varied greatly.

The water was frequently drawn off from the sand beds while the filters were in operation, causing air to be drawn into the interstices of the sand, and thus obstructing the passage of water and causing uneven rates of filtration in different parts of the sand bed.

It was found to be the practice of the attendant to expel air from the sand bed by admitting wash water without shutting the influent or effluent valves. This resulted in loosening the sand, permitting a rush of improperly filtered water into the effluent pipe. The mat of coagulant also was broken in places by this practice, thus permitting a more rapid passage of water at some points than at others.

With the water drawn off from the surface of the beds, the incoming coagulated water fell upon the sand with sufficient force to form excavations of over a foot in depth and also to prevent the formation at such places of the mat of coagulant. The injurious effect of the above described action on the process of filtration can readily be appreciated.

Several valves were found in leaky condition and while one of them was being repaired it was noted that a quantity of unfiltered water escaping therefrom found its way into the filtered water flume.

None of the control apparatus for preventing overflow of the filters was in repair, and a makeshift escape for such overflow was provided by leaving open the valves on the drains for carrying off soiled wash water from the surface of the filters. This not only prevented a suitable depth of water remaining over the sand, but was also wasteful of water which had been pumped from the lake and to which coagulant had been applied.

Test of September 11-12, 1906. The rate of filtration was found to fluctuate considerably, varying from 86 million gallons per acre per day to 147 million gallons per acre per day. The normal rate for these filters, in general practice should not exceed 125 million gallons per acre per day. The number of bacteria was not found to be high in either the raw or filtered water, thus the efficiency of filtration under unfavorable conditions could not be ascertained. The rate of washing the filters was found to vary considerably. The controllers for maintaining the level of water over the filters were out of repair. As a result, the filters frequently overflowed, some of the unfiltered water falling into the clear water flume and clear water basin.

Test of December 14-15, 1906. Frequent changes again noted in the rate of filtration. The water level on filters varied considerably. The filtered water basin was found to be overflowing at times, due to the fact that the filters were furnishing water faster than it was being pumped into the mains, resulting in considerable waste. A marked difference was observed in the appearance of the coagulated water on the two filters having coagulation chambers and that on the filter without a coagulation chamber, the latter having a precipitate finely divided and

imperfectly formed. The Pittsburgh filter was found to be loosing sand, either on account of broken strainers or excessive size of strainer openings. It was learned that on Saturday, November 10th, the lake water backed into the wash water drain and overflowed into the clear water flume. It was stated by the health officer that at this time the water in the mains was turbid.

Test of April 2-3, 1907. Considerable variation in rates of filtration was observed, the variation being from 52 million gallons per acre per day to 118 million gallons per acre per day. The average rate of filtration was 97 million gallons per acre per day. Measurements of consumption of water, as indicated by the revolutions of the filtered water pump, were made, and the average rate of pumpage was found to be 1,136,000 gallons per day. The average rate as figured from the April report, equals 94 million gallons per acre per day. During periods of high turbidity, requiring more frequent washing of the filters, it is probable that the average and maximum rates are considerably greater than the above figures; and it is at such times that another filter unit would greatly assist in obtaining better bacterial efficiency. Furthermore, it is sometimes necessary to shut down one filter for repairs, and at these times the rate of filtration through the remaining two filters is entirely excessive. It is, therefore, important that a new filter unit be added to the plant.

Since the last test the pressure regulator on the raw water pump and float valves for control of level of water on filters had been placed in repair, making it possible to maintain a constant depth of water over the surface of the sand in the filters.

It was learned that on January 3, 1907, there was a rise in the lake level, due to northwesterly winds, which made it impossible to wash the filters for one and a half days. During this time in order to make the filters pass the required quantity of water, it was necessary to occasionally break up the mats of precipitate on the surface by means of the mechanical rakes. On January 15, 1907, the engineer was taken sick and remained away for nine days. During this period the filters were in charge of men more or less inexperienced in their operation. From March 3rd to 7th, 1907, one filter was at all times out of service, due to renewal and repair of strainer systems. It was stated by the superintendent that in making these repairs about one-half the area of the filters was found to be underlaid by clogged strainers.

In none of the tests so far made has a north, northeast or east wind prevailed, under which circumstances the sewage laden waters of Conneaut Creek are likely to be driven over the intake.

TYPHOID FEVER.

Methods. The first step in the investigation of the typhoid fever situation was a review of the records of reported cases kept by the health

officer. It appeared that nearly all of the cases were recorded, but the information concerning each was very meager, including simply the name and address. The health officer stated that it was impossible to secure the proper co-operation of physicians in reporting cases in detail, and stated furthermore that the salary allowed the health officer was insufficient to warrant him in giving the time required to gather the necessary facts in making an investigation into the cause of the typhoid fever.

It appeared from the health officer's records that the great bulk of cases occurred during the months of December, January, February and March. Therefore, it was decided to cover these months only in the investigation to be made. A longer period would perhaps have been desirable but if accurate information was to be secured the investigation would have required much more time, and furthermore, it would have been difficult to obtain the necessary information concerning those cases occurring before the first of December with any great degree of accuracy. In order that the information might be at first hand and reliable, it was decided to visit personally all the cases that had occurred within the time limit set. In going about this it was found that many of the addresses were wrong, which made the work of visiting the cases consume more time than was anticipated. In order to secure the correct addresses, to confirm the information obtained from house to house visits, and to get additional information which was not obtainable from persons living in the houses where typhoid had occurred, all those physicians who had treated cases of typhoid were visited. In general an effort was made to secure the following information.

1. Name of patient.
2. Age of patient.
3. Name of physician.
4. Date when case was reported.
5. Date of physician's first visit.
6. Date when patient first went to bed.
7. Length of illness.
8. Description of disinfection used for discharges, bedding, room, etc.
9. Residence during two months pevious to illness, including visits made out of town, with dates.
10. Place of business during two months previous to illness.
11. Occupation during two months previous to illness.
12. Name of school or other institution attended during two months previous to illness.
13. Health before illness and length of time patient had been feeling badly immediately preceding illness.
14. Water supply used at home, at place of business, in school,

etc.; in case of well or spring water, description of well or spring surroundings.

15. Milk supply, from whom obtained, and whether or not patient was in the habit of drinking much milk before illness.

16. Raw foods, such as celery, lettuce and oysters, where obtained, and whether or not patient was in the habit of eating much of these articles of food before illness.

17. Previous cases occurring in same house, with dates.

18. Number of other persons living in the same house.

19. Sanitary condition of premises, whether bad, fair, good or excellent.

20. Whether or not house was connected with sewers.

21. Description of privies, refuse heaps, and other filth deposits near house.

22. Character of disease, whether mild, moderate or severe, and whether or not the diagnosis indicated a decided case of typhoid.

It was not deemed necessary to note any of those conditions which would throw light on the transmission of the disease through the agency of flies, as none of the cases under consideration occurred during fly season. As noted in the first part of this report, however, there are several localities where under favorable conditions much typhoid might be disseminated through the agency of flies.

In addition to the detailed information concerning each case, information regarding all conditions that might affect the public water supply were obtained. These included hourly wind conditions, daily rainfall, daily mean temperature, ice conditions at lake front, and known irregularities in the operation of the filtration plant. All of the meteorological data was obtained from the weather bureau station at Erie, Pennsylvania, this being thirty miles distant and the nearest point to Conneaut where such records are kept. The weather conditions at Conneaut will undoubtedly vary somewhat from these, but not to such a great extent as to interfere with the interpretation of results, excepting perhaps in the matter of ice conditions, which may vary considerably. Unfortunately there are no means of obtaining records of ice conditions at Conneaut itself.

Results. As a result of the investigation carried out as just outlined, the following data were obtained.

During the period beginning November 29, 1906, and ending April 2, 1907, there occurred in Conneaut 83 cases of typhoid, 81 of which were apparently infected in Conneaut and two apparently imported; but two of the cases were fatal. The distribution according to age is seen in the following table:

Age Period	0-9	10-19	20-29	30-39	40-49	50-59
No. of Cases	21	23	18	12	3	5

Of the 81 cases infected in Conneaut, 38 cases were described as mild, 32 as moderate, and 11 as severe.

Eighty of the cases infected in Conneaut used the public water supply. One of these claimed that the water was always boiled. The remaining case was a child nineteen months old, and it was claimed that it drank no water. This was probably a secondary case contracted from a grandmother who attended cases of typhoid fever in Pennsylvania a short time previously. Twelve of the eighty cases used the public water supply and also water from other sources, but there were not coincident cases among the users of any one of the other sources. All milk dealers had typhoid fever cases among their customers, but in no instance were there more than four consecutive cases among the customers of any one dealer. Only one of the dealers had a case of typhoid fever in his family. There were three cases among the customers of this dealer, but none of them were coincident.

The occupations of those having typhoid varied widely, but as might be expected, most were among the laboring classes, these forming the majority of the population.

Eleven cases occurred in houses where there had been typhoid a short time previously, and many of them, if not all, were secondary cases.

There was no evidence indicating raw foods to be a cause of the disease. Such foods obtained by the patients were from many dealers, and there were no coincidents that would lay the products of any one dealer open to suspicion.

To facilitate the study of the epidemic, the cases were plotted on a map of the city and numbered in the order of their sequence. The date when patient went to bed was taken in arranging this sequence. The map was also made to show the location of water mains and public sewers. A diagram was constructed, giving the daily and weekly occurrence of cases, also the current wind conditions, daily rainfall, temperature, ice conditions, and known irregularities in the operation of the filtration plant. (Owing to size of this diagram its publication is not desirable.)

Discussion of Results. The fact that eighty out of the eighty-one cases infected in Conneaut were users of the public water supply immediately attracts attention to this as the source of infection. This is emphasized by the further facts that only eleven of these cases also used other sources of supply, that nearly all used different sources, and that those using the same sources were not coincident in occurrence.

It will be noted in the table giving the distribution of cases according to age, that an unusually large number occurred among children under ten years of age. At first this would tend to throw suspicion on the milk supply as a partial explanation of the prevalance of typhoid fever, but as noted before, there was no preponderance of cases among the customers of any one milk dealer. Furthermore, there was only

one milk dealer who had typhoid in his family, and among the customers of this dealer there were only three cases of typhoid and none of these were coincident.

Raw foods may have been responsible for a few cases, but they cannot be considered as a factor in explaining the epidemic character of the disease.

The occupation of persons having the disease throws practically no light on the source of infection, except to emphasize the generality ot its occurrence. There were, however, three cases among workmen on Dock No. 4 at the harbor, which were infected at very nearly the same time, and it is possible that these men drank river water, which is occasionally pumped through the private mains of the companies owning the docks. On the other hand, these cases occurred simultaneously with a large number of others, which would tend to show that the source of their infection was common with all the rest.

A reference to the map shows the striking manner in which the cases adhere to the lines of water mains. These cases are to be found in all parts of the town. But three cases occurred among persons living elsewhere than along the lines of water mains, all three of whom lived outside the city but had either been in the city during the period of incubation or entered the city daily on business and drank of the public supply while there.

Before beginning a discussion of the results brought out by the diagram, a word must be said in regard to the incubation period of typhoid fever. Very little definite information is to be had on this subject, and it is not improbable that the period may vary considerably with different localities or with the virulence of the infection. There are several instances in the history of typhoid epidemics in which the period seems to have been ascertained with considerable definiteness. In the Plymouth, Pennsylvania, epidemic of 1885, the period of incubation varied from nine to fifteen days; that is, the first cases occurred nine days after the time the water supply was known to have been infected, and the last of the primary cases about fifteen days after. In the case of the epidemic at Wesleyan University, due to raw oysters, a particularly good opportunity was afforded for observing the incubation period, as the time of infection was known almost to an hour. Here it was found that the cases developed from eight to twenty-one days after the date of infection. One case occurred even as late as thirty days after the date of infection. In the great epidemic of typhoid in the cities on the Kennebec River it appeared from the report of Mr. George C. Whipple that the first cases occurred nine or ten days after the date of infection. How late subsequent primary cases occurred could not be ascertained. From the foregoing it will be seen that while the first cases quite generally occur eight, nine or ten days after the date of infection, others do not occur until a considerably later period.

It must be further borne in mind that in all the epidemics above mentioned the germs were unusually virulent. At Conneaut, however, the great maority of cases are described as mild or only moderate, and there were a great many cases—according to a number of the local physicians —which had the character of typhoid yet were so mild that they were not pronounced typhoid. It would, therefore, be reasonable to suppose that the period of incubation would be somewhat longer than usual and that the first cases would not appear until, say fourteen to eighteen days after the date of infection. If we suppose this possible, the diagram would be given the following interpretation.

A small epidemic during the last week in November, involving five primary cases, was caused by high water in the lake backing into the drain for soiled wash water from the filters and overflowing into the clear water flume. This high water in the lake was accompanied by moderate northeast and north winds, which would probably be sufficient to carry the infected water from the mouth of the creek over the intake.

An epidemic occurring during the second week in December was caused by the heavy rainfall producing a flood in the creek and the accompanying northeast wind of November 19th and 20th, which drove the polluted water from the mouth of the creek over the intake. Both this and the epidemic previously mentioned probably extended over three weeks' time, though the first epidemic was more or less obscured by the large number of cases during the first week of the latter epidemic.

High rainfall on December 6th and 7th must have caused a flood in the creek, and the continued rainfall throughout the month of December must have kept the water in the creek at a fairly high stage. Furthermore, during this month there were periods of rather high north winds and occasional northeast winds. Contrary to what might be expected, none of these conditions produced any effect on typhoid fever conditions. This is most likely due to the filters being in proper operation during this period. It is also possible that the ice by covering the lake front, prevented the north and northeast winds from moving the water from the mouth of the creek over the intake. That the ice did have an effect is made all the more reasonable by the fact that there had been considerable northwest and west winds which would tend to move it toward the shore. It may also be noted that this period followed the visit of the special assistant engineer on December 14th and 15th, at which time rather detailed instructions relative to the operation of the filters were given.

On the 3rd, 4th, 7th and 8th of January there was heavy rainfall, which undoubtedly caused a considerable rise in the creek. There was also rainfall nearly every day throughout the month, which must have maintained the water in the creek at a high stage. There were, of course, periods of freezing weather, but there were also a number of very warm days during this month, which would permit a considerable run-

off. Coincident with the high rainfall of the 4th and 5th, it was impossible to wash the filters for a day and a half on account of high water in the lake. Likewise there had been a considerable northeast wind on the 2nd of the month. None of these conditions, however, produced any typhoid fever, unless the one or two cases occurring during the latter part of January be attributed to this cause. It is probable that the lake at this time was covered over with ice and that the wind could not have had the injurious result that otherwise might have followed. About the middle of the month there were high north and northeast winds, but these were accompanied by low temperatures with ice at the lake front so that there was no effect on the number of cases of typhoid fever. From January 15th to 19th the engineer of the water works was ill and the filters were operated by inexperienced men. It is probable, therefore, that for a time at least they were inefficiently operated. During the second week in February there occurred four cases of typhoid fever in the city, followed at later dates by two others. It is quite probable that these cases occurred as a result of the improper operation of the filters during the engineer's absence. It is possible also that the high north and northeast winds which occurred at the beginning of the period during which the engineer was away from the plant had some effect on this occurrence of typhoid. The considerable north, northeast and east winds occurring on the 4th and 5th of February probably had no ill effect, unless they be responsible for a single case of typhoid during the last week of February.

A marked epidemic of the third week in March is at least partially due to the high and continued northeast winds on February 26th, 27th and 28th. The cases began to appear the first and second week following, but the largest number did not occur until during the third week, for which twelve cases are recorded. It is quite probable also that the repairs being made to the strainer system from March 3rd to 7th may have a great influence on extending and augmenting this epidemic; in fact, it is difficult to say which, the wind or the tearing up of the filters due to repairing the strainer system, was the most potent cause. It will be noted that previous to the high northeast wind there was a strong southeast wind blowing, which would tend to move the shore ice out into the lake, hence, permitting the northeast wind to have its maximum effect in driving the water from the mouth of the creek over the intake. On the other hand, the period when the greatest number of cases occurred is considerably removed from the dates of the northeast wind, which would strengthen the argument in favor of the tearing up of the filters.

CONCLUSIONS.

The conclusions reached as a result of the studies described in the foregoing report may be summarized as follows:

1. The data point most conclusively to the public water supply as the source of infection in nearly all of the cases of typhoid fever dealt with in the recent investigation.

2. Owing to the several faulty features in the construction of the filtration plant, previously described, it is at times impossible to afford complete protection to consumers, even with the most careful attention on the part of the filter attendants.

3. As a reasonable safeguard against future epidemics of typhoid and also to promote economy in water works maintenance, the following alterations in and additions to the water works plant should be made at once.

(a) A coagulation tank, of 125,000 gallons capacity, should be provided.

(b) A new filter unit should be added.

(c) Each filter should be provided with a suitable rate controller.

(d) The open wash water drain and the filtered water flume should be replaced with iron pipes.

(e) The clear water basin should be enlarged so as to provide at least one hour's storage capacity.

4. Conditions would be greatly improved by purifying the sewage of the city before discharging same into Conneaut Creek, but the purification of the sewage would not render unnecessary the reconstruction and proper operation of the filtration plant, since there would remain considerable danger from pollution by surface washings, discharges from vessels and from various other sources.

5. The sanitary conditions in certain portions of the city are such that in warm weather there is great danger of the spread of typhoid fever through other causes than the public water supply. These conditions may be greatly improved by (a) requiring all houses to connect with the public sewers wherever sewers are available; (b) prohibiting the discharge of sink drainage into ditches or over the surface of the ground; (c) prohibiting the use of privies belonging to houses having sewer connections; and (d) causing privies belonging to houses having no connection with sewers to be so built as to be readily accessible for cleaning and inspection, but encased in such manner that no fecal matter is exposed or likely to be washed away.

TABLE OF VITAL STATISTICS FOR CONNEAUT.

Year.	Population.	Total Deaths from All Causes.	Total Deaths per 100,000 Population.	Deaths from Typhoid.	Typhoid Deaths per 100,000 Population.
1895	5,186	60	1,158	2	39
1896	5,577	67*	1,200	1	18
1897	5,966	68	1,140	1	17
1898	6,355	68	1,070	3	47
1899	6,744	77	1,141	12	178
1900	7,133	92	1,290	6	84
1901	7,522	90	1,200	5	67
1802	7,911	78	986	5	63
1903	8,300	51	615	2	24
1904	8,689	93	1,070	5	58
1905	9,078	95	1,050	2	20
1906	9,467	91	962	0	0

* 11 Months.

NOTE — It is likely that the number of typhoid deaths for some of the years shown is inaccurate, and the probabilities are that the actual number is greater than the number here given; e. g., the number of typhoid deaths for 1899 was given by the health officer as nine, whereas investigation by the State Board of Health showed the number of deaths to be twelve.

A copy of this report was furnished to the health officer of Conneaut, and to Hon. Frederick C. Howe of Cleveland, Secretary-Treasurer of the Conneaut Water Company.

Mr. Howe replied that he was anxious to do everything possible to bring about proper conditions at Conneaut, and that he would take up the report with the manager of the plant. He stated that some of the things complained of had been bettered since the report was made, namely, the screens, which were badly clogged, had been taken out, cleaned and replaced, in many instances with new ones, increasing the capacity of the filters, in the opinion of the manager, from twenty-five to forty per cent. A much greater supply of alum was being used, thereby nearly doubling the cost of the operation of the plant, and Mr. Howe asked the Board's advice as to the amount of alum that ought to be used in the operation of the plant under different conditions.

He was informed that the coagulant produced by alum varies with the temperature of the raw water, the amount of chemical used, and also the period of time allowed for the precipitation of the hydrate; that at the Conneaut plant, at that time, the period of time allowed for coagulation was in no case greater than fifteen minutes, and for that reason the amount of alum required was very much greater than would

be necessary if from one to two hours coagulation should be provided for.

The Board advised the use of one to two grains per gallon during the winter, but during the summer months it was thought equally good results could be obtained with a less amount of alum. From the location of the plant at Conneaut the weather conditions, particularly the direction of the wind, make it necessary at times to use greater quantities of alum than ordinarily advised.

The superintendent of the plant was requested to keep a record of the turbidity of the lake and also the amount of alum used. From these records and from those obtained at similar plants, the Board intends to draw up a table showing the amount of alum necessary with varying degrees of turbidity of the water in the lake.

APPENDIX I.

DISCUSSION OF RESULTS OBTAINED AT EXAMINATION OF FILTRATION PLANT.

Results of Examination of Conneaut Filter Plant.

Date.	Total No. of Samples.	Source.	Bacterial Counts.			Coli Present.			Average Efficiency of Filters.
			Maximum.	Minimum.	Average.	No. of Samples.	1 cc.	100 cc.	
6(20–1)06	10	Raw Water ..	1,600	75	580	8	0	0	—
6(20–1)06	14	Filtered " ..	270	12	85	8	0	0	85%
9(11–12)06	6	Raw Water ..	900	70	230	6	0	1	—
9(11–12)06	10	Filtered " ..	140	16	58	8	0	0	75%
12–4–06	3	Raw Water ..	6,100	3,700	4,900	3	0	0	—
12–4–06	8	Filtered " ..	550	0	250	6	0	0	95%
12–4–06	3	At Cleveland Hotel	65	0	32	3	0	0	—
4(2–3)07	6	Raw Water ..	500	115	325	6	0	2	—
4(2–3)07	17	Filtered " ..	125	5	35	17	0	3	89%
4(2–3)07	4	At Cleveland Hotel	42	6	19	4	0	1	—

APPENDIX II.

DISCUSSION OF RESULTS OBTAINED IN EXAMINATIONS OF FILTRATION PLANT.

In discussing the results obtained in the examinations of the filtration plant, it may be well to state the standard of efficiency generally required both in constructing new plants and in operating old ones. These are generally stated as follows: That the filters shall remove all visible color and turbidity, and that when the number of bacteria in the raw water is greater than 3,000 per cubic centimeter, they shall remove at least ninety-seven per cent; when the number of bacteria in the raw water is less than 3,000, not more than 100 shall be found in the filtered water.

A study of the results in Table No. 1 shows that during three of the four examinations made, the filtered water was satisfactory from the above standpoint, as it is seen that the average number of bacteria found was less than 100 per cubic centimeter. During the test of April 2-3, 1907, however, it will be seen that the colon bacillus, denoting sewage contamination, was found (although in small numbers) in several samples of the filtered water. Although the effluent was satisfactory from the standpoint of total number of bacteria, yet the presence of coli would make the supply open to suspicion, as it was evident that there was some pollution of the raw water which was not entirely removed by the filters.

In the test of December 4, 1906, the filters were removing but ninety-five per cent. of the bacteria; but as no coli were found in either the raw or filtered water, the effluent was entirely satisfactory. If at this time however the river water should have been blown over the intake, it is quite probable that the bacterial removal by the filters would not have been satisfactory.

In general, it may be said that although the filtered water was satisfactory at the time the examinations were made, it is apparent that had the condition of the raw water been such as to put a heavier load on the filters, it is probable that the effluent would not have been satisfactory. That this is so is emphasized by the fact that although the average number of bacteria found during the tests was low, yet at times, as shown in the column of maximum numbers it is apparent that the efficiency of removal obtained was but slight.

On April 5, 1907, at the completion of the examination of the filtration plant, several samples were taken at Conneaut Harbor to study the character of the water in the river and the effect of the pollution caused by the discharge of sewage into the stream. The accompanying diagram, which is not to scale, shows the sampling points and the general relative position of the intake with reference to the mouth of the river. At the

time these samples were taken, there was a high north wind blowing, causing such a heavy sea that it was necessary to use a launch in the collection of the samples as a row boat could not have lived. The action of the sea churned up the bottom of the lake, causing a decided increase in turbidity and in bacteria in the lake water at the intake, and was also accountable for the considerable amount of organic matter and total solids noted in the first two samples which are of lake water. Sample No. 2, although taken between the outer breakwaters, consisted largely of lake water, which, however, was polluted by the river, as shown by the increase in the number of bacteria and also by the presence of the colon bacillus, although in but few numbers.

Of the two samples from the river, No. 3 was taken from a point below the sewer outfall of District No. 3, and it will be noticed that there were twice as many bacteria per cubic centimeter as was found in the sample taken at the railroad bridge. Sewage pollution is shown at both points by the high bacterial content and also by the presence of coli in considerable numbers. At the time of the sampling the course of the river to the east could be noted by the difference in color in the water of the lake.

In general, it may be said that these samples are representative of the ordinary conditions at the harbor, except at such times as the wind is blowing from an easterly direction. During east winds, the course of the river may readily be traced by the color of the water and is seen to flow over the intake of the water works. The effect of such pollution of the raw water may readily be estimated, and at such times it is necessary to maintain the best possible efficiencies of bacterial purification by the filters.

TABLE NO. 2.

SAMPLES AT CONNEAUT HARBOR.

No. of Sample.	Source.	Bacteria Per c. c.	Coli in 1 c. c.	Coli in 100 c. c.	Alkalinity.	Total Solids.	Chlorine.	Free Ammonia.	Alb. Ammonia.	Nitrites.	Nitrates.	Oxygen Required.
1	Lake at East Breakwater	2,000	0	+	73	410	9.5	.042	.362	.004	10.0	9.65
2	Lake at Intake to Water-Works	800	0	0	74	285	8.0	.018	.288	.003	10.0	9.60
3	River at Point Inside Breakwater	14,500	+	+	48	217	1.2	.044	.240	.003	30.0	7.75
4	River at Railroad Bridge	7,800	+	+	45	169	2.3	.050	.174	.004	4.0	7.15

REPORT ON THE INVESTIGATION OF AN EPIDEMIC OF TYPHOID FEVER AT COSHOCTON.

At the request of Mr. W. B. Miller, health officer of Coshocton, an investigation was made in that city of an epidemic of typhoid fever. Coshocton was first visited by the chief engineer and engineering assistant on August 5, 1907. The engineering assistant was left on the ground and in accordance with instructions gathered information relative to the various cases. On August 6 and 7, 1907, the assistant engineer visited Coshocton and in company with the engineering assistant completed the investigation. The following report was submitted:

The city of Coshocton lies in the southeastern portion of Coshocton County of which it is the county seat. The site of the city is at the point where the Tuscarawas River and Walhonding Creek unite to form the Muskingum River. In the neighborhood there is considerable comparatively level bottom land composed principally of river drift deposits. It is on a rather extensive area of this bottom land that the city of Coshocton is situated. The sides of the stream valleys rise in broken hills to heights of several hundred feet above the bottom lands. Coshocton has a fairly rapid growth and its population at the present time is estimated at 8,000. The area within the corporation limits is approximately 925 acres. The drift deposits in the valley are formed principally of coarse gravel with here and there a stratum of clay.

The public water supply is drawn from a large dug well in the drift and located on a point of land lying between the Tuscarawas River and Walhonding Creek. The well is carefully covered over and provided with a water-tight manhole, so that surface contamination is practically impossible. There are no sources of local pollution, and all analyses of the water made in the laboratory of the State Board of Health, including that made at the time of the present investigation, have shown the supply to be of very good quality from a sanitary point of view.

In addition to being the county seat, Coshocton is somewhat of a manufacturing center, the principal articles of manufacture being advertising signs and devices, enamel ware, coarse wrapping paper, china ware, bottles, axles, and spindles.

The general sanitary condition of the city seems to be good. Nearly all parts are reached by sewers and the public water supply mains. Most premises present a neat and clean appearance. The streets, however, are not kept in as clean condition as is desirable, which is due to the lack of a properly organized street cleaning department. Garbage is removed by a contractor operating under a contract with the city; the material is taken one and a half miles from town and plowed into the ground. Ashes and rubbish are collected by private parties and dumped wherever convenient.

There are but few private wells in Coshocton; nearly the whole population depends on the public water supply for all purposes. The latter seems to meet with general popular approval, though there are occasional complaints on account of deposits in dead ends of the mains. There are still a large number of privies in use, most of which consist of vaults loosely boarded up and are undoubtedly a source of pollution of the soil. Many of the privies were found to be in bad condition.

Upon arrival of the representatives of the State Board of Health in Coshocton it was deemed advisable to obtain detailed information relative to each case. This was effected by visiting each case and recording the results of the examination on the regular typhoid fever blanks recommended by the State Board of Health. The information obtained from an examination of these blanks may be summarized as follows:

RESULTS OF EXAMINATION.

There were found to have occurred thirty-nine cases up to the time of the investigation and it is understood that several more have occurred since. These cases were plotted on a map and each given a number corresponding to the order of its occurrence. A diagram was also constructed, showing the date that each case went to bed; the numbers on this diagram correspond to those on the map. Twenty-two cases were among males and seventeen among females. The following table gives distribution of cases according to age.

Table No. 1.

0-9	10-19	20-29	30-39	40-49	50-59	60-69	Total
5	13	8	6	4	3	..	39

The general health of patients previous to illness is shown in Table No. 2.

Table No. 2.

Poor	Fair	Good	Total
9	9	21	39

As nearly as could be ascertained from inquiry, the cases showed symptoms of the disease from one to three weeks before going to bed.

The sanitary conditions of the premises are shown in Table No. 3.

Table No. 3.

Poor	Fair	Good	Excellent
1	9	18	11

It was found that ten cases occurred in houses with sewer connections, while twenty-nine occurred in houses without sewer connections.

The number of cases who had regularly used city water was twenty-

eight; the number who had used both city and well or spring water or water from some other source, ten; the number who had used well water only, one.

Twenty-nine cases out of the thirty-nine had been regularly in town for at least two months previous to illness.

Inquiry relative to the milk used by the cases gave the following results: Number of cases who regularly used milk from J. E. Buker's dairy, twenty-six; number who occasionally used milk from other dairies, two; number who had regularly used Buker's milk previous to July 4th, one; number who had regularly used Buker's milk previous to July 14th, one; number not using Buker's milk but who were known to have eaten ice cream made from said milk, three; number who may have used Buker's milk, one; number who had never used Buker's milk at any time, four. Those not regularly using Buker's milk obtained milk from at least seven other dealers. Of those who had been out of town from one to three weeks before going to bed (ten in number), six had used milk from other dairies than Buker's regularly while in town and three had used Buker's milk regularly. All four cases that had never used Buker's milk had been out of town from one to three weeks previous to illness.

DISCUSSION OF RESULTS.

Referring to the map of the city, it was seen that all of the cases, with the exception of one, were to the east of the Pennsylvania Railroad tracks, this being the locality in which Buker's milk was principally sold. It was only occasonally that this milk was delivered on the opposite side of the Pennsylvania Railroad tracks. It is apparent that there is no relation between the location of the water mains and the distribution of typhoid fever cases. This diagram shows the extreme sudden character of the epidemic, and it will appear that all of the cases, excluding case No. 1 which cannot be properly included within the epidemic, occurred within a period of seventeen days. Twenty-two of the cases, or slightly over half the total number, occurred within six days. The number of males and females is very nearly the same, indicating that both sexes were exposed to the infection to practically the same extent. The distribution of cases by ages has no special significance, but it may be noted in passing that the distribution agrees fairly closely with typhoid epidemics at other places. The general health of patients before taken sick with typhoid appears in the majority of cases to have been good, indicating that predisposing influences to the disease were not great; from this it may also be inferred that the infection was correspondingly more virulent. The date of appearance of the first symptoms could not be satisfactorily obtained but, as already noted, appeared to be from one to three weeks before going to bed. The vagueness of this data made its use impossible as a means of indicating the probable date of infection.

It will be seen from Table No. 3 that in the great majority of cases the general sanitary conditions about the premises were good or excellent though only one-fourth were connected with sewers. The general use of screens and the fair condition of privies on premises where there were cases of typhoid fever would preclude the supposition that the disease was transmitted to any extent by flies. The spread of the disease was probably further effectively prevented by the almost universal disinfection of all discharges. The city water could not have been a cause of infection as is evident from visual inspection and chemical and bacteriological analyses. This conclusion is reinforced by the fact that the cases do not correspond in any degree to the location of water mains. On the other hand, well water could not have been a prolific source of the disease since twenty-eight of the cases used city water at all times, ten more used well water or spring water in addition to city water, and but one used spring or well water at all times and this one case was an employe in Buker's dairy. The fact that twenty-nine of the cases, or practically three-fourths, were regularly in town for a period of at least two months before being taken sick shows that the infection was more than likely due to some cause within the city limits. The remaining cases will be later referred to and accounted for.

The very large number of twenty-six cases out of thirty-nine which regularly used milk from one dairy (i. e., that of J. E. Buker) and no other, immediately throws suspicion upon the milk from this dairy. This suspicion is still further increased by the fact that seven others were known to have used Buker's milk either as such or made into ice cream. One case, as has been noted, may have used Buker's milk, but this could not be ascertained with certainty. The four cases that had never used Buker's milk had all been out of town within a period during which the infection may have occurred and therefore may have all been imported cases.

The weight of the above evidence renders it practically certain that the milk from the dairy of J. E. Buker, if not the sole cause of the epidemic, was at least the primary cause.

An inspection of the dairy showed the surroundings of the house and its interior to be but fairly clean. The cellar under the house was quite wet and in a generally unsanitary condition. The cows are allowed to pasture in fields to the northeast of the dairyman's residence. The cows so far as could be learned are of good stock and healthy. They were housed in a barn not adapted to dairy purposes and which was rather dirty and poorly kept. The milk was all delivered to customers in sealed bottles. Previous to June 26, 1907, all of the milk was cooled in the cellar of the dairyman's house and the bottles were washed at the shallow dug well poorly protected at the surface and within about seventy-five feet of an improperly constructed privy. Analysis indicated this well to be grossly polluted. Since June 26th, however, practically all of the milk has been

cared for in a small spring house near the fields where the cows are pastured and perhaps 800 to 1,000 feet to the northeast of the dairyman's residence. The spring water used for washing the bottles and cooling purposes may be partially mine drainage more or less perfectly filtered by percolation through the soil. It appears from analysis to be somewhat polluted, though not dangerously at the time of sampling. The new spring house at the time of inspection was in fairly neat and clean condition, yet it was not equipped with proper apparatus for thoroughly cleansing the receptacles and bottles used for milk. As has been noted, there were five cases of typhoid among persons connected with the dairy, including Mr. Buker himself. All of these cases occurred simultaneously with the general outbreak, namely, on the 23rd, 24th and 30th of July and on August 4th. One of these cases had been complaining for sometime before being taken sick though there was no evidence showing definitely that the infection had been received elsewhere. A very exhaustive search failed to show with precision the primary cause of infection, this information being deemed desirable for a complete discussion of the epidemic. There can be no doubt, however, that the weight of the other evidence points conclusively to the milk as being the general cause of the disease.

The future safety of Coshocton from epidemics due to infected milk supplies lies in the more sanitary handling of milk even if the cost involved to the dairymen necessitates a corresponding increase in the price of milk to consumers. To effect this it is recommended that an order be issued by the local board of health, requiring that all milk dealers selling milk within the city of Coshocton adhere to a set of rules and regulations designed to secure the handling of milk under such thorough sanitary conditions that its infection by disease germs would be a practical impossibility.

REPORT OF EXAMINATION OF SAMPLES OF WATER FROM COSHOCTON.

(PARTS PER MILLION)

Source of Sample.	Spring	Faucet in boiler room	J. E. Buker spring	J. E. Buker dug well
Date of collection	Aug. 10, 1907	Aug. 10, 1907	Aug. 10, 1907	Aug. 10, 1907
Number of sample	7170	7171	7172	7173
Color	....	none	....	....
Turbidity	none	none	trace	none
Sediment	none	none	trace	none
Odor	none	none	none	none
Oxygen required	.60	.70	.80	2.00
N. as Ammonia albuminoid	.012	.012	.224	.070
N. as Ammonia free	None	.014	trace	.360
N. as Nitrites	.001	.001	.016	.050
N. as Nitrates	1.0	trace	4.0	10.0
Chlorine	5.6	30.0	7.4	70.0
Alkalinity	242	182	none	158
Incrustants	....	52	....	....
Total solids	445	334	901	460.
Loss on ignition	....	23	....	....
Iron	....	.1	....	....
No. of bacteria per c. c.	2800	3400	270	660
Colon bacilli present	yes in 1 cc.	not in 50 cc.	not in 50 cc.	not in 50 cc.

October 15, 1907, a copy of this report was furnished the health officer of Coshocton, and also, as an appendix to the report, a set of rules, or orders, providing for the supervision of dairies and the sale of milk within the city. It was suggested that the board of health adopt such orders.

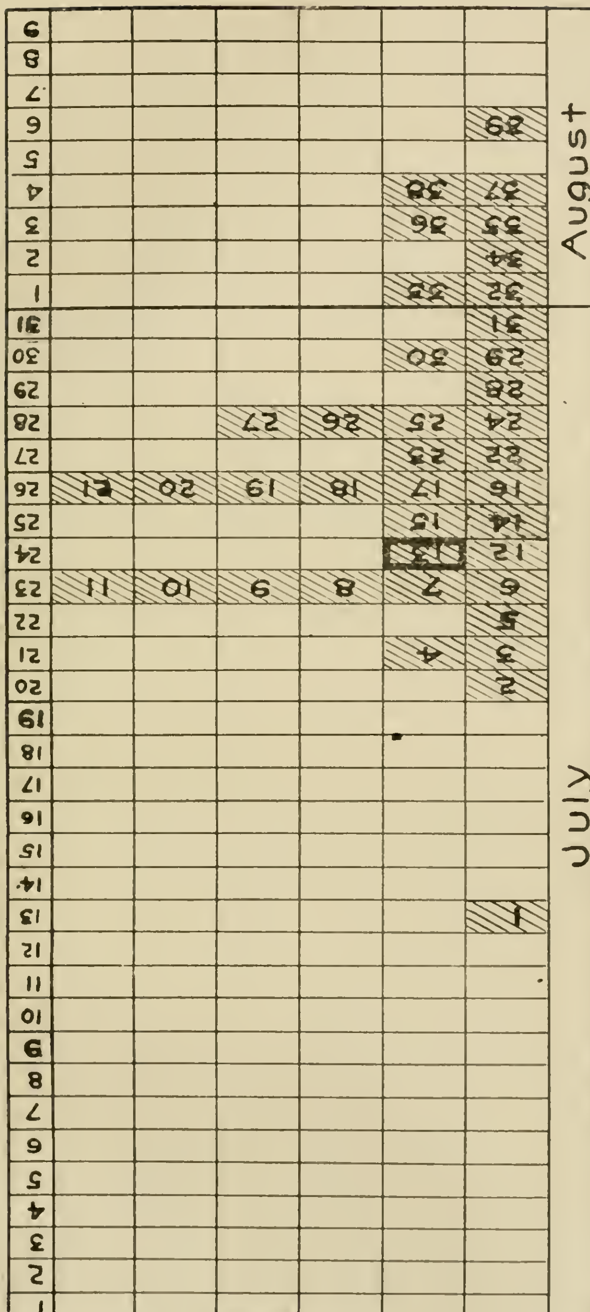

DIAGRAM SHOWING DISTRIBUTION OF TYPHOID CASES, JULY 13-AUGUST 6.

NOTE: Fatal Case, July 24.

REPORT ON GENERAL SANITARY CONDITION OF BRADFORD WITH SPECIAL REFERENCE TO THE ADVISABILITY OF PERMITTING THE DISCHARGE OF SEWAGE AND OTHER PUTRESCIBLE WASTES INTO EXISTING SEWERS.

In response to a request of the health officer of Bradford, relative to the advisability of permitting the discharge of sewage and other putrescible wastes into existing sewers, the assistant engineer visited that village on July 10, 1907. The following report was made:

Bradford is a village of perhaps 2,000 inhabitants, lying on the boundary line between Darke and Miami counties, and on a small water course, known as Ballinger's Run, which passes through the northern portion of the corporation and flows from west to east. The area within the corporation limits is estimated at three-fourths square mile. The surrounding country is quite flat and is mostly devoted to farming. The village is located at the junction of the Chicago and Indianapolis divisions of the Pennsylvania Railroad. This road has recently located large freight yards at this point, and it is probable that in the future, repair shops and other works connected with the railroad will also be located in Bradford. In consequence of the above developments, it is quite probable that an impetus will be given to the growth of Bradford and the introduction of manufacturing industries of which, at present, there are practically none.

Bradford has no public water supply and private wells are universally used. It is estimated that 250 to 300 wells are located within the corporation limits. These are said to penetrate in general two or three feet of black surface soil, eight to ten feet of clay, one to one and one-half feet of hard-pan, and through the remainder of their depth, water-bearing gravel. The majority of the wells are dug and range in depth from twenty-five to twenty-eight feet, deriving their supply, as will be observed, from the water-bearing gravel beneath the hard-pan. So far as is known, the stratum of hard-pan is found throughout the entire area of the village; and it would, therefore, appear that the subsurface water is fairly well protected. There are a few wells, however, of shallow depth which obtain water from sand pockets in the clay overlying the hard-pan. About one-third of the wells are within fifty feet of privies, though there is an order of the health officer making the above figure the lowest permissible limit. According to a statement of the health officer, it is practically impossible to enforce this order. It is probable that the quality of the water in some of the wells is affected by the close proximity of the privies, more especially those wells obtaining their supply from pockets of sand above the hard-pan. The privies are mostly of the vault type; sometimes the vault is lined with concrete and sometimes

with brick, but more frequently consists of a hole dug in the ground. Owing to the impervious character of the clay subsoil, contents of privies do not leach away rapidly, and on an average they require a cleaning about once a year. While the clay soil prevents the seepage of privy contents to great distances, yet the soil in the immediate vicinity is undoubtedly grossly polluted and may affect nearby wells. Privies could in general be built at a lower first cost and also permit of greater ease in cleansing and inspecting, if constructed in accordance with the suggested list of rules and regulations given in Appendix I. The provision for water-tight receptacles placed at or above the surface of the ground, prevents the pollution of the soil; and the provision for a tight compartment surrounding the receptacles that will not permit the entrance of flies, prevents the dissemination of disease germs by these insects.

The problem of the proper use of sewerage seems to be the most difficult with which the sanitary authorities of Bradford have to deal. At present there exist, two systems of tile drains that may be described in detail as follows:

Harrison Avenue Sewer. Harrison Avenue sewer is a tile drain lying in the western part of the village and was built about two years ago by Darke County and the village of Bradford. It begins in the southwestern portion of the village and runs north in Harrison Avenue until School Street is reached; thence it passes through an alleyway and into the open fields and extends northward for perhaps half a mile, discharging into Ballinger's Run to the northwestward of the village. The drain varies in size from eighteen inches to twelve inches in diameter and is made of unglazed field tile laid with uncemented joints. Along its length are placed several manholes with cover gratings permitting the entrance of storm water. So far as is known, the main line of the Harrison Avenue sewer receives no sewage or domestic drainage directly. The most objectionable drainage enters it through tributaries. Two of these tributaries enter from the westward and lie between the two divisions of the Pennsylvania Ralroad and four enter from the eastward, three of these being north and one south of the railroad tracks. The main tributary entering from the eastward receives the drainage from several short laterals; three of the laterals lie in Miami Avenue and receive storm flow from about twelve catch basins. None of them, so far as is known, contribute any offensive wastes. The fourth carries the effluent from a cesspool, or so-called purification plant, belonging to the Pennsylvania Railroad Y. M. C. A. rest house. This cesspool may be described as follows: It consists of a circular chamber twelve feet in diameter and twelve feet high in the straight. The roof is contracted into a 3-foot square manhole which emerges upon the surface of the ground. The circular chamber is divided into two equal compartments by a 6-inch dividing wall, termed (1) the inlet compartment and (2) the filter compartment. At the bottom of the dividing wall are two

openings provided with removable screens, each four feet six inches long by three feet high, covered with No. 14 gage wire woven into a 1-inch by 1-inch mesh. The filter compartment is provided with a screen placed horizontally about four feet above the bottom of the chamber and supported on an iron grid. This screen covers the entire cross-sectional area of the chamber and also consists of No. 14 gage wire woven into a 1-inch by 1-inch mesh. Supported on the screen is a filter bed composed of four feet of selected cinders varying in size from one-half inch in diameter to about two inches in diameter. Sewage from the rest house enters the inlet compartment through an eight-inch vitrified tile pipe, the invert of which is placed eight feet six inches above the bottom of the compartment. Sewage passes downward under the dividing wall and upward through the filter, thence into an effluent drain above the filter and about seven feet six inches from the bottom of the chamber. This effluent pipe enters the tributary drain to the Harrison Avenue sewer, above referred to. The effluent has the appearance of strong septic sewage, is highly putrescible and contains a large quantity of suspended matters. The odor from this effluent rises through catch basin openings on Miami Avenue and creates at times a very offensive nuisance. The system of so-called purification serves only to retain within the cesspool a portion of the suspended solids, but the liquid portion is not purified.

A resident in the western part of the village who has a house connection to one of the tributaries of the Harrison Avenue sewer, has followed the example of the Pennsylvania Railroad Y. M. C. A. rest house and constructed a concrete vault in a manner which he deems will purify sewage. The vault is five feet square and eight feet deep (dimensions approximate), and the same is divided into two chambers by means of a 4-inch wall constructed of loosely laid brick. The house drainage and material from the privy to be located over the vault are to be received on one side of the brick partition, and the passage of the material through the partition is expected to effect its purification. From what is known at the present time regarding methods of sewage purification, it can be positively stated that the passage of sewage through a loosely laid brick wall will only purify the same in the slightest degree. The most that can be expected is a retention in the first compartment of a portion of the solid matters in suspension.

Since there is a feeling among certain residents of Bradford that the installation of some device similar to the above will render the introduction of sewage into the existing storm water drains unobjectionable, it is important that it be thoroughly understood that efficient purification of sewage cannot be effected by these methods.

Stanton Avenue Sewer. In the eastern part of the village is a county tile drain constructed during the past spring. It also serves as a storm water sewer within the limits of the village, the storm water gaining entrance through several catch basin manholes. The sewer begins at

Walnut Street in the southeastern portion of the village and runs northward in Stanton Avenue to Church Street; thence east in Church Street for a distance of two blocks to Moody Avenue; thence north in Moody Avenue two blocks; thence in a north-northeasterly direction across commons until the tracks of the Pennsylvania Railroad are reached. Beyond the tracks the drain continues as an open ditch for a distance of perhaps one-third of a mile, then for a short distance until Ballinger's Run is reached, the drain is constructed of 2-foot field tile. The open ditch portion of the drain is subject to clogging, which causes water to back into the tile passing through the village. Conditions might be remedied either by laying tile for the entire length, or by removing the tile at the end of the drain and regrading the ditch. It has required the utmost vigilance on the part of the health officer to prevent house connections to the Stanton Avenue sewer.

It is not generally realized that the sewers now in place are entirely unsuitable for taking care of sewage and domestic wastes. They are even unsatisfactory as storm sewers, since being constructed of open jointed soft tile, they are subject to clogging, especially by the entrance of tree roots between the joints. Under such conditions the discharge of putrescible wastes into the sewers is bound to create objectionable odors that will escape from manholes. The odors may also enter the cellars of house through sewer drain connections.

Sewage and domestic wastes should be taken care of in a properly constructed system of sewers. Two methods of sewerage may be used, known respectively as the combined and separate systems. Since there is at times a decided preference between the two, their relative merits will be discussed with reference to local conditions at Bradford. In the former, or combined system, both storm water and general domestic wastes are received in the same conduits. These must be well constructed ot vitrified tile pipe with cemented joints. The size must not only be large enough to carry off sewage and domestic wastes, but also must provide for the largest storm water run-off that may be anticipated. Outlets for such sewers must be conducted to such a distance from habitations so as not to cause offense. In the case of Bradford, the dry weather flow of a combined system and also parts of the storm flow would require purification before being discharged into Ballinger's Run, which is the only available stream in the neighborhood for receiving such a discharge and which has a summer flow so small that it could not be counted upon to effect a sufficient dilution to render the wastes innocuous.

With sewers constructed according to the separate system, the sanitary sewage and domestic wastes are carried off in an entire separate set of conduits from that in which the storm water is removed. With such a system, the sanitary sewers need be of only such a size as to care for the sewage and domestic wastes alone. Where purification is necessary, as would be the case at Bradford, the purification plant may be designed

for a smaller quantity of sewage than would be required with a combined system. If pumping is necessary, as may be the case in Bradford, the volume of sewage to be so handled will be very much smaller. With a separate system of sanitary sewers, storm water could be taken care of by constructing storm water drains, whenever and wherever needed, and permitting the same to discharge into the nearest ditch or watercourse. This is made possible by the fact that storm water unmixed with putrescible wastes is unable to create offensive odors. From the above considerations it will be seen that the separate system of sewers for Bradford will be much cheaper that the combined ystem.

It is probable that the village of Bradford cannot at the present time raise sufficient funds to construct a system of sewers as outlined, yet it would be highly desirable to begin as soon as possible with a portion of the construction, such portion to include the main outfall sewer. The tributary laterals could then be constructed as needed, or when funds are available. In order that the construction of the sewers for the village may be systematically carried out, and in accordance with a consistent plan, the village should employ a competent consulting engineer who is a specialist in sewer design and construction and have him prepare detailed plans, specifications, and detailed estimate of cost of a complete system of sanitary and storm sewers including purification works, and pumping station (should the latter be required). Such plans, specifications, and estimate of cost should then be submitted to the State Board of Health for official approval. These plans would then serve as a guide in all future construction and would prevent the hap-hazard location of tile drains which at present prevails.

It may be objected by some that such a carefully constructed system of sewers is not necessary for a village the size of Bradford, and this to a certain degree is true, but it must be borne in mind that the village is growing and may in the near future grow much more rapidly than it has in the past. Furthermore, a public water supply will no doubt be installed in the not distant future, which will greatly increase the volume of sewage and render necessary some other system of caring for it than privy vaults and cesspools. If the construction of a proper system of sewers is not undertaken at once, in the course of a few years the village will find itself in possession of a large number of filthy, noisome drains inadequate for carrying off storm water and other wastes that gain access to them. Great difficulty will be experienced at such a time in inducing citizens to vote for improvements, for the reason that those who have house connections to such drains will be unwilling to subscribe to improvements which more greatly benefit their neighbors than themselves. Furthermore, the money expended in the construction of drains such as those at present in use, and the cost of their removal, when a more properly constructed system will have become a necessity, will have been entirely wasted. It would appear quite conclusively,

therefore, that the village could not proceed more wisely or more economically than by employing the services of a consulting engineer, as above outlined.

Meanwhile, every effort should be made on the part of the local authorities to prevent the connection of house drains to existing sewers, thus maintaining the village in proper sanitary condition pending the time when the construction of a more suitable system of sewers can be undertaken. The discharge of domestic wastes into existing sewers should be made unlawful by an ordinance of council. This will enable the village solicitor to proceed legally against any infringement which may be reported. It seems to be the opinion in Bradford that such connections can be as effectively prevented by an order of the health officer, but this is not the case in view of the fact that the discharge of putrescible wastes into drains must first be proved a nuisance or dangerous to health before the matter comes under the health officer's jurisdiction. The difficulty, under certain conditions, of proving such discharge a nuisance or dangerous to health will readily be understood. Furthermore, persons brought into court by an order of the health officer must be prosecuted by the health officer personally. An ordinance suitable for Bradford is suggested in Appendix II.

CONCLUSIONS.

(1) Rules and regulations relative to the construction of privies should be revised in accordance with suggested set of rules and regulations given in Appendix I.

(2) The village should retain the services of a consulting engineer, who should be required to submit to the authorities plans for sewers covering the entire village and designed on the separate system. The work of the engineer should also include detail design of pumping station, sewage disposal plant, a complete estimate of the cost of various portions of the work, and specifications governing the manner in which the work is to be constructed. These plans, estimates, specifications, etc., after being duly approved by the State Board of Health, should serve as a basis for the construction of a system of sewers.

(3) The village council should pass an ordinance making it unlawful for any person to discharge putrescible wastes into existing sewers and drains.

(4) The cesspools and screening devices belonging to the Pennsylvania Railroad Y. M. C. A. rest house, and at least one residence, serve only to remove a portion of the solid matters, leaving the liquid portion unpurified and offensive. Effluents from these should not be permitted to discharge into any of the village drains.

(5) It should be the duty of the health officer to discover any infringement of the ordinance mentioned under (3), and if necessary he should be given additional assistance either in men or funds for carrying out the work.

APPENDIX I.

SUGGESTED RULES FOR CONSTRUCTION OF PRIVIES.

1. All privies should be provided with *water-tight* receptacles resting *at* or *above* the surface of the ground and so placed that all fecal matter is discharged into them.

2. The receptacles in which fecal matter is contained shall be entirely enclosed in a suitable comparement under the seats, which will *prevent the admission of flies,* but shall be so constructed as to be readily accessible for *inspection* and the *removal of receptacles.*

3. All seats shall be provided with *hinged* covers, *which will not remain open* unless held open.

4. An ample supply of powdered slaked lime or dry loamy earth shall be accessible for sprinkling over the fecal matter after each use of the privy.

5. As soon as *full,* receptacles shall be emptied and the material *removed at least one-fourth of a mile* beyond the city limits and buried in the ground.

6. It shall be the duty of the health officer or his representatives to inspect all privies *not less frequently than once in two months* and to prosecute persons found not complying with the above rules.

APPENDIX II.

SUGGESTED FORM OF ORDINANCE MAKING IT UNLAWFUL TO DISCHARGE PUTRESCIBLE WASTES INTO EXISTING SEWERS.

ORDINANCE.

An ordinance to provide against the discharge of sewage and objectionable wastes into village and county drains within the village of Bradford.

Be it Ordered by the Council of the Village of Bradford, State of Ohio:

SECTION 1. That no sewage, overflow from privy or cesspool, sink drainage, manufacturing wastes, or any matter, liquid or solid, capable of undergong putrefaction, shall be discharged or be permitted to be discharged by any person or corporation into any sewer, drain or ditch within said village, unless said sewer, drain or ditch has been specially constructed for receiving such wastes or other offensive or putrescible substances and has been approved for such purpose by the State Board of Health.

SEC. 2. That a person or corporation found guilty of violation of this ordinancee shall be subject to fine of not less than fifty dollars ($50.00) or more than two hundred dollars ($200.00).

August 20, 1907, a copy of this report was sent to the health officer of Bradford, and to the engineer, maintenance of way, Pennsylvania lines, at Columbus.

REPORT UPON THE UNSANITARY CONDITION OF EAST LIVERPOOL.

The board of health of the city of East Liverpool, in special session assembled, unanimously adopted the following resolution:

"WHEREAS, The sanitation of the city of East Liverpool has reached such a deplorable condition that it is a menace to public health, the city being threatened with epidemics of malignant disease by reason of such conditions, and

"WHEREAS, The city council has failed and refused to respond to all the persistent requests and resolutions of the local board of health asking for aid and authority to relieve such serious conditions, therefore be it

"*Resolved*, That the president of the State Board of Health be requested and urged to at once personally visit and inspect the conditions existing in the city of East Liverpool, that he may give to said city all the aid and relief in said emergency that lies within the power of the State Board of Health."

This resolution, passed May 16, 1907, was forwarded to the State Board of Health, and accordingly, the president of the Board visited East Liverpool on May 24th and made the following report:

East Liverpool, a city of about 30,000 inhabitants, is situated on the Ohio River, in the southeast part of Columbiana County. The rather sharp declivity constituting the town site admirably adapts its streets to the quick riddance of storm waters. No storm sewers are needed, and none are built, to dispose of surplus surface waters.

In the matter of picturesqueness, as well as sanitary possibilities, the site is all that could be desired. The majestic curve made by the Ohio—Indian word for "beautiful"—as it sweeps down from the northeast, washes the feet of the city, and rolls away to the southwest, well justifies the pedigree of the noble river. On the other side, and face to face with the city, the smiling valleys and gracefully outlined hills of West Virginia "stand dressed in living green."

Notwithstanding the charms with which Mother Nature had so generously endowed this spot, it appears that everything is not as it should be. On May 16th a letter reached the Ohio State Board of Health advising that body that the sanitary goose, instead of "hanging high," was actually floundering in the mud—even worse than mud. The letter, which was signed by W. T. Blake, president of the local board of health, prompted the visit to which these observations have refer-

ence. Hence a brief, but necessarily incomplete, review of such features of the situation as might affect the health of the public is advisable.

The city is supplied with raw water from the Ohio River. Remembering the millions of people whose wastes are carried into that stream this water supply is, to say the least, open to suspicion, and that fact is thoroughly realized. A very prominent citizen has been urging the installation of wells on an island in the river. The water could reach these wells only after being filtered through the sand. The filtered water from these wells would be assembled in a large storage well and pumped from thence into the city system. The gentleman referred to, a man of large mechanical experience, said that more money was paid out annually by the people for spring water than would be required to complete such an installation. It is with the municipal council of East Liverpool to secure the advice of a sanitary engineer and provide the people with a safe water supply. A very able article in the *Engineering News* of May 23, 1907, concludes: "The day when all surface water supplies will be filtered is rapidly drawing near."

Many, probably most, of the cities of Ohio are supplied with underground, naturally filtered water. Seventeen have built special filtration plants for the purification of waters from surface streams. The great cities of Cincinnati, Columbus and Toledo are today engaged in building such plants.

The city of East Liverpool is partially sewered with the separate system, which is wise—surface waters perform a useful function in flushing the streets. A project is on foot to pave certain streets in which there are no sewers. Councilmen should prevent such slip-shod, cart-before-the-horse business. The question is with them, and they should safeguard the people's real interests even if they have to "face the frowning world."

The disposal of night soil in unsewered districts is, and has always been, a dirty problem. The board of health obtained from a farmer the privilege of dumping the same on his land, where he promises to work it under ground for fertilizing purposes. His price for the privilege was $50. The council authorized $25.00, and the council should appropriate an additional $25. Economy is most commendable, but such parsimony is reprehensible, besides being discouraging to the board of health. Board and council should work in harmony; otherwise it is the public welfare that suffers.

In such a closely built up city the garbage question is a persistent trouble-breeder. The city has no garbage cremator. Some years ago private parties built a garbage furnace on the river bank, directly in front of the most congested area of the city. Much was promised; among other things that the appartaus would consume night soil. It was set into operation during high water in the river. When the high water receded there was disclosed a pipe opening, through which the

night soil, which had been delivered to the cremator, made its happy escape. It smeared its slimy path down to the river's edge and, like the swine in the miracle, "perished in the waters." At least the Ohio, which hides away in its generous bosom so many of the sins of the children of men, made no protest. The people did that. The sight and smells were too much, and the night soil was remanded to a back seat.

It is probable that those who use the furnace most, and thus get rid of vexations, would say that it was better than nothing. The board of health and all who intelligently crave cleanly methods take the contrary view. The fire at the furnace end was burning litter, and paper and other dry stuff; along its farther stretch the moisture-laden masses were slowly dried and charred, the resultant debris being most unsightly. There being no smoke-burner at the foot of the stack, the smoke and vapors from the foul mass went freely to the top and flung out a black flag full of fearful portent right over the middle of the town. The building is one of the masterpieces of Architect Ramshackle. The collection of the wastes is unspeakably slouchy.

Who's to blame? The health board claims to have exerted its best efforts to bring about decent conditions. The private garbage company does not appear to be on the highway to fortune. Plainly this problem, as well as the other problems referred to, is with the council, that is, with the people of East Liverpool. The people are the makers of the council, and the latter will be just what they make it. The personnel of the sanitary organization impresses one most favorably. Dr. Charles B. Ogden, the health officer, is a familiar figure in sanitary circles and is known to be a most intelligent and zealous official. Sooner or later such men, and the people of East Liverpool, will come to realize that no form of paternal authority will, or ought to be permitted to, step in and perform those functions of self-government which our laws impose and entrust to peoples and communities. The public welfare can be secured by the payment of the old price — eternal vigilance — and in no other currency. It needs only that to rectify all the evils complained of, and to make East Liverpool one of the most attractive cities in Ohio.

A copy of this report was sent to the health officer, Dr. Ogden, and to the mayor, on May 28, 1907.

REPORT ON INVESTIGATION OF SANITARY CONDITIONS AT MASON.

At the request of Dr. J. M. Van Dyke, mayor of Mason, the assistant engineer was directed to visit that village and make a general investigation of sanitary conditions, with special reference to a certain storm sewer. At the further request of the mayor, the assistant engineer also

made an examination of the public school building, with reference to its suitability for school purposes. The following report was submitted:

The village of Mason is in the southwestern portion of Warren County on a small run known as Muddy Creek. Above the village this creek has a watershed area of approximately six square miles. Mason is an old community and its population remained practically stationary for many years. It is claimed, however, that during recent years there has been a fairly rapid growth, and the present population is estimated at 900. The village lies near the divide between the Great and Little Miami watersheds. The surrounding country is gently rolling, excepting near the water courses, where it becomes mildly hilly. Near Mason it is claimed that the bed rock is found at a depth of 71 feet. It belongs to the Cincinnati group, and the rock lying nearest the surface is a blue limestone. The surface drift is entirely of glacial origin and consists principally of clays interstratified here and there with thin beds of sand. Such beds of sand are usually found near the surface and serve as a source of water supply for wells.

Mason is primarily a farming center, the surrounding country being unusually fertile, though the fertility of the soil has been and is being to a large extent dissipated by improper farming methods. A considerable portion of the population of the town is employed at the powder and cartridge works at Kings Mills, a village on the Little Miami River and about three miles distant to the eastward.

Outwardly Mason presents a clean and well kept appearance, but the general sanitary conditions are not all that could be desired. There is no system of sewers that can be depended upon for rapidly and safely carrying off domestic wastes. Wells, upon which nearly the whole population depends (there being no public water supply), are mostly shallow and vary in depth from about 8 to 14 feet. They derive their supply from a sand stratum at comparatively few feet below the surface of the ground. This stratum of sand seems to be met with in almost all parts of the village and yields a very constant supply. Many of the privies are located near wells, though seldom nearer than 30 feet, so far as this could be ascertained from limited observation. The privies are nearly all provided with vaults. Most of them are loosely bricked up; others are boarded; and practically all of them have open bottoms. Many of the privy vaults are deep enough to penetrate the water-bearing stratum from which most of the wells derive their supply. It would seem that pollution of the ground water is inevitable. It was stated that in former years there had been a considerable prevalence of typhoid fever and other communicable diseases. This condition, however, was attributed to the school house well only, which at that time derived its supply from the sand stratum above referred to and was about 75 feet removed from two large privy vaults. The conditions above described, together with previous experiences with the school well, should be taken

as indicative of the probability of typhoid fever becoming prevalent at some future time. There are other villages in the state which obtain water from private wells under almost precisely the same conditions, which are subject to a great deal of typhoid fever.

In view of the danger of pollution to wells from nearby privies, the latter should, as soon as possible, be reconstructed so as to prevent the entrance of fecal matter into the soil. To this end all privies should be provided with water-tight receptacles placed at or above the surface of the ground and in such manner as to be easily inspected. Frequent inspections should be made by the health officer to ascertain that the privies are in good repair and being properly cleaned. Somewhat the same method of privy construction might be used as described in detail in the discussion relative to the school house privy, which will be found in another part of this report.

STORM WATER SEWERS.

The village possesses several poorly constructed storm sewers into which it has been quite difficult to prevent the discharge of sanitary wastes. In the eastern part of the town is a short sewer, constructed by private parties, which receives some storm drainage from the street and a moderate amount of sink drainage. The liquid which lies in pools near the mouth of the sewer is quite putrescible and frequently gives rise to disagreeable odors and has been the cause of some complaint. Another short sewer, receiving only storm drainage, discharges into a meadow. The flow of this sewer was small in quantity and apparently quite unobjectionable at the time of inspection. The longest of these storm water sewers, which may be termed the Southwest Avenue sewer, was built in 1897. It lies in the western part of the town and has been the cause of considerable difficulty of a peculiar nature.

Southwest Avenue Sewer. It was primarily in connection with this sewer that the investigation herein described was taken up. The sewer starts at Main Street where it receives the flow of several catch basins, runs a short distance along Northwest Avenue, then through Southwest Avenue to West Street. Crossing West Street it passes through private property belonging to Andrew Baxter and terminates on the east side of East Street where it discharges into a natural ravine, also passing through private property. Formerly the sewer discharged on the east side of West Street on to the property of Andrew Baxter, through which it flowed in a shallow depression at the head of the same ravine into which the discharge now takes place. Suit was brought against the village by Baxter, and the village was advised by the court previous to a hearing of the case to extend the sewer to its present outlet which was considered by the court to be the beginning of a natural water course. In accordance with this advice, the sewer extension was made, but after its completion suit was again brought by the T. L. Keever and Bert

Thompson heirs, owners of the property on to which the discharge now takes place. This suit was first tried in the Court of Common Pleas of the county, and a decision was given favorable to the village. The case was appealed to the Circuit Court, in which the decision was reversed and the court decreed that the village be given six months in which to extend the sewer to a suitable outlet. At this juncture the mayor of the village appealed to the State Board of Health for advice relative to the manner in which the decree should be carried out.

In order to obtain as nearly a correct view of the situation as possible, the sewer will be described in some detail as follows:

The total length of the sewer is about 1,200 feet. It is built of vitrified sewer pipe laid with open joints. There is a short section, perhaps several hundred feet in length, which is of loosely laid stone. The diameter of the vitrified pipe varies from 12 to 20 inches. There are no manholes or other means of entrance into the sewer. Tributary to this sewer are twelve catch basins, and in addition it is said to receive a moderate amount of sink drainage from one residence and cesspool wastes from another residence. The latter wastes are partially purified by percolation through a mass of gravel which was placed for this purpose. In addition to this, the sewer receives infiltration of ground water through the open joints of the sewer pipe. The grade on which the sewer is laid is not known and is probably variable and presumably ample. The depth at which the sewer is laid is not definitely known, but is said to be a maximum of 9 or 10 feet and a minimum of about 2 feet.

It will be seen from the above description that there are no possible means for inspecting or cleaning the sewer. As yet, however, there has been on difficulty from clogging. The catch basins for the most part are very crude and might at any time permit the entrance of materials that would clog the sewer. At the time of inspection, as already noted, the flow at the outlet was very small, hardly exceeding several hundred gallons per twenty-four hours, and was perfectly clear and apparently nearly all ground water. There was no evidence of organic matter in the stream bed below the outlet and there were decidedly no offensive odors. If this sewer contains nothing but storm water and ground water and can be so controlled by the municipality as not to permit the entrance of objectionable wastes in the future, there can be no possible objection to its existence from a sanitary point of view. It is, however, improperly constructed and in its present condition and location it is possible that connections will be made for the drainage of cesspools, or for house drainage direct.

In view of the court's decision, it will be necessary to either abandon the sewer or extend same to an outlet in Muddy Creek. At the same time the sewer as it exists should be reconstructed in a more approved manner as follows: The line of sewer should be placed directly in the center of the street where possible, should be made of vitrified sewer pipe

with carefully cemented joints and should be laid to even grade and straight alignment. At each change in direction or change in grade there should be placed a manhole. Where such changes in grade or in alignment are more than 300 feet apart, there should be placed lamp holes or additional manholes, so as not to exceed 300 feet between any two entrance points. It should be pointed out that this sewer was never submitted to the State Board of Health for approval, though constructed since the law providing for such approval was passed; and that, therefore, before extension or reconstruction of the sewer is begun, detailed plans and profile should be submitted to the State Board of Health for formal approval. An ordinance should be passed by council, expressly stating that no sink drainage, cellar drainage, cesspool overflow, sewage, or any putrescible wastes shall be permitted to enter storm sewers.

With the above outlined construction, it would be possible to readily inspect the sewer and clean it when necessary. Furthermore, by having the sewer in the middle of the street and easy of access for inspection, it would be impossible for property owners to make connections thereto without such connections being detected.

NECESSITY FOR SANITARY SEWERS.

A matter for consideration is the probable necessity for a system of sanitary sewers in the not distant future. Already some of the residences are provided with modern plumbing which uses large quantities of water and requires a more suitable outlet than a cesspool or privy vault. Furthermore, it is likely that Mason will soon acquire a public water supply which will greatly increase the quantity of sewage to be handled.

In order that the village authorities may be advised as to the best method of procedure in constructing a system of sanitary sewers, when the same shall become necessary, and in order to avoid useless expense by the laying of sewers in a hap-hazard and improper manner, it would be highly desirable for the authorities to secure the services of a competent sanitary engineer to design a complete system of sanitary sewers for the entire village. Such a system need not necessarily be built at once but may be built piecemeal as required, but always in conformity with the general plan.

Even in the absence of a public water supply, a properly constructed system of sanitary sewers would be of great value in preventing the widespread pollution of private wells, which now undoubtedly takes place. As an immediate measure for safeguarding the quality of the ground water, all privies should be reconstructed as already outlined.

Plans for a system of sanitary sewers, as described above, should receive the approval of the State Board of Health before construction is begun in conformity with such plans.

MASON PUBLIC SCHOOL BUILDING.

The village of Mason has a single school house which accommodates all school children within the corporation limits. It stands in the eastern part of the town on a lot 125 feet wide by 320 feet deep. It is a two-story brick building of simple construction and quite old. The number of pupils at present enrolled is 135.

In general the building is not in conformity with modern methods of school construction. There is no basement, though there is a small cellar directly underneath the stairways, which is used for storing coal. The first floor rooms are about a foot above the ground, and the space under the floors is inadequately ventilated by a few small openings. The building has four school rooms, practically alike, and which may be described as follows:

ROOMS.

Floor Space and Air Space. Each room is 41 feet long, 26 feet wide, and 11 feet from floor to ceiling. This gives a floor space of approximately 1,765 square feet and an air space of approximately 11,700 cubic feet. The number of pupils in each room ranges from 24 to 45. In the room having the most pupils, there is a floor space of 23.7 square feet; and in the room having the fewest pupils the floor space is 44.5 square feet for each pupil. The corresponding air spaces for the above, are 260 cubic feet and 490 cubic feet, respectively, for each pupil. Authorities on school sanitation are generally agreed that the former figure should be not less than 15 square feet and the latter not less than 200 cubic feet. From this it will be seen that the rooms are amply large.

Floors. The floors are of quarter-sawed yellow pine and are in fairly good condition, not noticeably splintered, and with comparatively small spaces between the floor strips. They are, however, somewhat worn in places and quite dirty. More suitable wood for flooring would be maple, birch, or oak, the last named being the most desirable. The floors could be greatly improved by applying a wood filler and giving them an oil finish, so that they may be the more readily swept and cleaned and be less absorbent.

Walls. The walls are painted with a light tint of green, with a wainscoting of a nondescript brown. The walls were so very dirty and sooty that it was difficult to distinguish the exact shades. The colors themselves are not objectionable, but the walls should be kept clean.

To prevent the spread of contagious diseases among the children, the school rooms should be disinfected at regular intervals, or at least after such times as there has been a prevalence of diphtheria, scarlet fever, or other communicable diseases common to children. As a part of this disinfecting process, the walls as well as the floors and woodwork should be thoroughly washed, and preferably the wash water should contain a disinfecting solution, such for instance as mercuric chloride.

Blackboards. The blackboards are arranged as well as is possible under existing conditions. They are of a nearly black slate that does not disagreeably reflect the light. An improvement could be made, however, in the chalk troughs by arranging screens on hinges over them to hold the chalk and erasers. This would allow the dust to fall below into the troughs, where it would cause no inconvenience in handling the chalk and could be removed by the janitor after school hours.

LIGHTING.

The lighting of the school rooms is very poor and constitutes the greatest objection to the continued use of the building for school purposes. The total area of light space in each room is 122.5 square feet, the windows being 2½ feet wide by 7 feet high and seven in number. The light space is equal to 7.3 per cent. of the floor space, which is wholly inadequate. The percentage of light space to floor space should be 17 to 25. The rooms are dark and dingy, and matters are made very much worse by the improper location of windows and the poor distribution of light. The strongest light comes from the rear where there are four windows in each of the rooms. In the east side rooms there are two windows on the left and one on the right, the latter being near the front of the room. The windows in the back of the room place the pupils in their own light, which the feebler light from the left is unable to counterbalance. The placing of a window on the right-hand side of the room and especially near the front is an exceedingly bad arrangement, as the light therefrom is very severe on the eyes of pupils sitting near it. It was stated by one of the teachers that pupils on the right-hand side of the room complain greatly of the injurious effect on their eyes. The rooms on the west side are even worse, if possible, than those on the east side. The strongest light, as before, is from the rear, and the next strongest light is from the right; a very feeble light comes from a single window on the left. It will be seen that this condition is exactly what it should not be. The light in the rooms is not only feeble but, owing to the large wall spaces between the windows, falls in streaks, causing shadows and half shadows which are very severe on the eyes.

In a school room the best light conditions are obtained when the windows are all placed on one side of the room, to the left of the pupils, and the wall spaces between the windows made the least practicable. This arrangement gives a strong dispersed light, and the hands of the pupils when writing will not cast shadows on their work. Where owing to nearby buildings or other obstruction, sufficient light cannot be obtained from one side, it is permissible to place a few windows back of the pupils, but the light emanating from these should be much feebler than that coming from the left. The principal objection to these few windows placed in the rear of the room, is that they are severe on the eyes of the teacher. It would seem practically impossible to reconstruct

the Mason school building in a manner to make the light effects what they should be.

Shades. Another matter that affects the light conditions in the rooms is the kind and arrangement of shades. These are of a rather dark color and hang from the tops of the windows. A shade may thus not be drawn to exclude direct sunlight entering near the bottom of the window without shutting out nearly all of the light. Furthermore, many of the shades are in a bad state of repair. A much better arrangement would be to have the shades fixed so as to draw up from the bottom of the windows.

FURNITURE.

The desks and chairs (or benches, as in this case), are of the old-fashioned type and non-adjustable. Modern authorities on school sanitation are very strong in condemnation of this kind of school furniture and recommend desks and chairs that are adjustable, both with respect to height and relative position. It is urged by these authorities that habitually improper positions of children while seated at their desks are the cause of considerable deformity.

BASEMENT AND PLAY-ROOMS.

As already noted, the building is not provided with a basement underlying the whole building, which should be provided with well lighted play-rooms into which the pupils may go during the recess in inclement weather. Under existing conditions, during bad weather it is necessary for the pupils to spend recess time within the school rooms themselves. This not only forces the pupils to remain in the vitiated air which they have been breathing, but also prevents proper airing of the rooms, which should take place at each recess time.

CLOAK ROOMS.

Another objectionable feature in connection with the school building is that there are no cloak rooms, the wraps of the children being hung on hooks placed about the walls of the school rooms. This is highly objectionable, especially in damp weather, as the wraps are liable to emanate disagreeable odors throughout the room. Under proper conditions, there should be cloak rooms well lighted and which may be thoroughly aired while school is in session.

HEATING AND VENTILATING.

The heating and ventilating of the building is unsystematic, inefficient, and undoubtedly far more costly in operation than a central furnace or other heating plant would be. On the east side the first floor room is provided with a large furnace which is expected also to heat the room above. The furnace is placed directly in the center of the room

and draws its fresh air supply from the outside near the ground. The difficulty of this arrangement is in securing an even distribution of heated air throughout the room and in maintaining the temperature constant. Furthermore, the attention required by the furnace is more or less of a distraction to the pupils, and the presence of the furnace in the school room gives rise to much coal dust which settles in great quantities on walls, floors, and furniture. The furnace is of the hot air type and draws its fresh air supply from the outside of the building. Provision is made for drawing off the vitiated air from the rooms and carrying same to the outside of the building. The fresh air inlet and vitiated air outlet for both rooms on the east side of the building are near together and in the center of the room. The efficiency with which the air is renewed by the means described is very problematical. The west side of the building is heated by separate stoves placed in each room. In the case of these rooms, all of the ventilation must be provided by the windows. Ventilation from windows in school rooms is very objectionable in the winter time, in that cold drafts are created which may lead to serious consequences to the health of the pupils.

In a properly constructed heating and ventilating system for a school building, the heating should all be done from a central plant. The air should be taken from the outside of the building and after being heated to the proper temperature, should be forced to the several school rooms, preferably by means of a fan or blower. On reaching the school room, it should be admitted at an inside wall through a number of openings extending along the length of the wall and near the ceiling. The air thus admitted would pass across the room near the ceiling until the opposite outside wall is reached. Here the air would be somewhat chilled, which would cause it to descend and pass back across the room near the breathing line of the pupils. On the same side of the room at which the air is admitted, there should be a corresponding set of outlets for vitiated air, placed in or near the floor. No ventilation should be effected by means of opening windows. In the case of a room having a northern exposure or which for some other reason may be difficult to heat, it is advisable to place a few steam coils near the windows, for use in extreme cold weather.

PRIVIES.

The privies are somewhat better constructed than is ordinarily the case with school houses in the country or in small communities. They are provided with vaults about 12 feet in diameter and 12 feet deep. The sides are of concrete carefully built, and the bottoms are left open. Over the vault is a superstructure hexagonal in shape and provided with a ventilating flue passing upward through the center and opening directly into the vault. The closets are arranged about the central flue and are entered from without. The privies are not maintained in as cleanly

condition as would be desirable, though conditions here are considerably better than have been observed elsewhere at school buildings.

If a new building is to be constructed, undoubtedly the best method would be the installation of a system of water closets within the building. This, however, may be rendered impossible by the absence of a suitable system of sewerage or a convenient water supply. If, as may happen, privies are the only thing feasible, they should be of an entirely different type from those at present in use and should embody the following essential features:

(1) Privies should be placed as near the school building as practicable without occasioning odors within the building. A safe distance would be 100 feet.

(2) As a protection against the weather, there should be covered or partially covered approaches from the school building to the privies; and in the interests of morality the approaches for boys and girls should be screened from each other.

(3) The privies should be housed in substantially constructed wooden buildings, roomy, well ventilated and well lighted. In winter time they should be moderately heated.

(4) One seat should be provided for every twenty pupils, and a urinal should be placed in the boys' privy. The urinal should be of porcelain and so constructed as to be readily cleaned.

(5) Water-tight receptacles for fecal matter should be provided and placed at or above the surface of the ground and in such a way as to be readily accessible for cleaning and inspection. (Oil barrels cut in two make good receptacles.)

(6) The receptacles should be enclosed by a suitable housing that will not interfere with their ready inspection and removal, but which will screen them from general view and prevent the entrance of flies.

(7) All seats should be provided with hinged covers that will not remain open unless held open.

(8) At least once a day the janitor should thoroughly sprinkle the receptacles with fine dry loamy earth. (Sand, clay and ashes are much less suitable for the purpose.)

(9) Receptacles should never be allowed to fill to overflowing. On becoming reasonably full, the receptacles should be removed, emptied and cleaned. On being replaced, they should be generously sprinkled with hydrate of lime.

(10) Interior and exterior privies should be kept scrupulously clean and in good repair.

In conclusion, it may be stated that a new school building in Mason is greatly to be desired, and before accepting any design, the village authorities should submit the plans to the state authorities for review and suggestions.

Copies of this report were sent to the mayor and the health officer

of Mason, December 27, 1907, and their attention was called to the recommendation that the village employ some competent engineer to prepare plans for a comprehensive system of sewers, to be built a part at a time, as required.

They were also advised that the conditions found at the school building should be materially changed; or, what would be better, that a new school house be built; and that a board of health has authority to require the board of education to make necessary changes in school buildings to improve health conditions.

REPORT ON SANITARY CONDITIONS AT MINSTER WITH SPECIAL REFERENCE TO THE INSTALLATION OF A SUITABLE SYSTEM OF SEWERS.

On July 3, 1907, a letter was received from Mr. Ben H. Meiners, mayor of Minster, requesting an investigation of certain sanitary evils existing in Minster and an examination relative to the introduction of a system of sewers. In response to this request the assistant engineer visited Minster July 8, 1907, and with the assistance of Mayor Meiners and Mr. M. A. Anthony, clerk of council, obtained data on which is based the following report:

The village of Minster is located in the extreme southern portion of Auglaize County on the Miami and Erie Canal and has a population of about 1,500. The area of the village within the corporation limits is something over one square mile. The central portion is thickly built up but a large part of the incorporated area is still in open fields. The surrounding country is very flat and the natural drainage of the village has been impaired by the presence of the canal. Minster is primarily a farming and dairying center though there exist also a few cooperage works.

Several investigations by a representative of the State Board of Health have already been made in Minster. The first of these related to a nuisance, in which it seemed impossible for the aggrieved parties to obtain proper action on the part of the local health authorities. (See "Report of the Assistant Engineer on Nuisance at Minster," July 17, 1906.)

Another investigation was made of a storm sewer intended to drain territory in the western part of the village but which failed to perform its function on account of faulty construction. (See "Report of the Assistant Engineer on Unsanitary Conditions Caused by a Storm Sewer at Minster," July 17, 1906.)

Somewhat later the village was visited by an unusual prevalence of typhoid fever. The local authorities becoming alarmed, an investigation was requested of the State Board of Health by the mayor. (See "Re-

port of the Assistant Engineer on the Prevalence of Typhoid Fever at Minster," December 4, 1906.)

The results of the typhoid investigation showed that the sanitary conditions prevailing in Minster were at a very low ebb and that the disease was primarily caused by improperly constructed privy vaults located in close proximity to shallow wells. In the conclusions forming a part of this report it was stated that the typhoid fever morbidity could most effectively be reduced by the installation of a pure public water supply and a properly constructed system of sanitary sewers. Furthermore, it was stated that immediate relief could be obtained by the filling in of all polluted wells and the reconstruction of all privies in accordance with a suggested list of rules and regulations given in the report. Owing to the difficulty of continuously enforcing these rules and regulations, however, it was advised that such rules be considered in the nature of a temporary expedient and that it should be the ultimate aim of the village to install as soon as finances permitted a suitable system of sanitary sewers and a public water supply of good quality from a sanitary point of view.

Influenced somewhat by the above recommendations, a few citizens of Minster have been interested in the matter of constructing as soon as possible a system of sewers. Among these there exists the feeling that the principal danger arises from the discharge of wastes from a creamery into an open ditch which during the greater part of the year has no natural flow. These wastes lying in the bed of the ditch and there undergoing putrefaction undoubtedly constitute a very offensive nuisance and one that should be abated as soon as possible. It is, therefore, desired to convert the ditch into a closed sewer, this sewer to be constructed of vitrified pipe laid with uncemented joints and to discharge into the canal at the present outlet of the ditch. It is also proposed by those in favor of this scheme to provide tributary sewers in several of the principal streets of the village, these tributaries to receive storm water, excess of ground water, and cellar drainage. The matter of cellar drainage would involve the installation of house connections and therein lies a danger which should by all means be avoided. With such a convenient drain, it is almost certain that it would be used for the reception of general domestic liquid wastes, including sink drainage and sewage. That this temptation to use storm sewers in this manner exists in Minster is well illustrated by the fact that now existing storm sewers entering the canal near the Seventh Street bridge have recently had connected to them a number of water closets and sink drains.* One of these sewers receives large quantities of woolen mill waste. Such wastes will seep into the ground through the open joints of the sewer and thus become a new source of pollution to private wells which may be even more dangerous than the present improperly constructed privy vaults for the

*See "Report on Improper Use of Sewers in Minster," July 16, 1907.

reason that the sewers permit the objectionable material to influence a much greater area. It might be suggested that the sewer be laid with carefully cemented joints, but this would defeat one of the principal purposes for which it would be designed, namely to receive and carry off the excess of ground water which accumulates in certain parts of the village. Nor does this greatly improve matters for the reason that the canal into which the sewer would finally discharge already receives more putrescible wastes than it can care for at times of low water during the summer. A still further modification of the sewer might be suggested; namely, the omission of the main line in the present open ditch. This would not be as objectionable as might at first appear, for the reason that the creamery waste, while creating a very offensive nuisance, is not responsible for the dissemination of specific disease germs. If the tributary sewers are to be used for storm water and sub-surface drainage only, there could be no objection to their discharge into the open ditch.

At best, however, should the sewers be constructed in any of the ways above outlined, it would be an exceedingly difficult matter to prevent the discharge into them of wastes of an objectionable character. It may further be mentioned that the main object of constructing such a system of sewers, namely, the abatement of the nuisance caused by the discharge of creamery wastes into the open ditch, could be more cheaply effected by the installation at the creamery of a suitable purification plant by means of which the wastes could be rendered clear and non-putrescible before gaining entrance into the ditch. All things considered, it would appear that the construction of the system of storm water sewers would fail to improve sanitary conditions in a manner commensurate with the cost of constructing such a system.

Ultimate relief can only be secured by the introduction of a suitable system of sanitary sewers for receiving all domestic wastes and sewage and carrying them to a point where they may be properly disposed of. With such a system in place, storm water sewers could be constructed wherever and whenever needed and permitted to discharge into the nearest ditch or water-course without the likelihood of being used for sanitary wastes. As outlined in the report on typhoid fever, such a system of sanitary sewers would conduct the sewage to one point where it should be passed through a suitable purification plant before being discharged into any water course. Owing to the local topography, it is quite likely that pumping of the sewage would be necessary. The complete system of sanitary sewers would undoubtedly be expensive and probably beyond the means of the village at the present time. It would, however be possible for the village to raise sufficient funds to construct at least a portion of such a system and to leave the remainder to future growth as needed. If the system of sewers is to be constructed in this piece-meal fashion, in order that the work may be consistently and economically carried out, the village should employ as soon as possible a consulting en-

gineer who is a recognized expert in work of this character. He should be required to submit a very complete report to the local authorities which should include the following:

(1) A map of the village showing the location of all sewers, both storm and sanitary, capable of meeting all reasonable future demands.

(2) Detailed plans and profiles of sewers, sewage disposal plant, pumping station, and all accessories.

(3) Detailed estimates of cost for the construction of the various portions of the work, to be used in preparing assessments on property owners.

(4) A complete set of specifications.

(5) A list of all properties now provided with drainage into existing sewers, with a description of the character of such drainage.

(6) A report describing the manner and order in which the various portions of the sewerage system could be best and most economically constructed.

All maps, plans, estimates, specifications and reports should then be submitted to the State Board of Health for final approval.

The construction of improperly designed sewers is at any time inadvisable. If, therefore, the village is not prepared, owing to lack of funds, to secure the proper engineering advice and proceed with the construction of a well designed system of sewers, it would be much preferable to wait until such funds are available. Meanwhile there exists a very grave danger in the present methods of disposing of fecal matter. The condition of most of the privies throughout the village is such as to pollute wells and also to form centers for the dissemination of disease germs through the agency of flies. And furthermore, there is no doubt (as pointed out in the report on typhoid fever) that these conditions have been in the past a prolific source for the spread of that disease. These matters should be dealt with at once by the local health officer who has full authority to issue an order regulating the construction of privies; and this order should be enforced with the utmost rigor, and, if necessary, council should place at the health officer's disposal sufficient funds for so doing.

A copy of this report was sent to the mayor and council of Minster, July 23, 1907, and they were urged to give these matters prompt attention. The health officer was notified that it was very important that the drinking water furnished by wells should be protected against pollution from privy vaults, and was urged to issue an order providing for the reconstruction of privies throughout the village in accordance with the rules and regulations suggested in the report made by the State Board of Health on the typhoid fever outbreak at Minster.

REPORT ON INVESTIGATION OF NUISANCE AT MILFORD.

The health officer of Milford, Dr. Con W. Gatch, on May 27, 1907, requested an investigation of a nuisance created by the discharge of liquid wastes into a storm sewer which in turn has its outlet in a depression formed by an old mill-race. The accumulations in this depression it was stated created a serious nuisance and constituted a menace to the public health. On June 18, 1907, the assistant engineer visited Milford and made the investigation requested, in which he was assisted by Dr. Gatch, health officer, Mr. James R. Powers, street commissioner, and Mr. F. A. Riehle, member of council and chairman of committee on nuisances. The following report was submitted:

The village of Milford is located in the northwestern portion of Clermont County on the Little Miami River. The population at the present time is estimated at 1,500. The area within the corporation limits could not be ascertained but is probably in the neighborhood of one square mile. The village is located on the side of a hill of blue limestone. This limestone formation lies between the present stream valley and the old valley formerly occupied by the stream, so that it is isolated from the neighboring highlands and surrounded by drift deposits. Ground water is everywhere available in the valleys but is difficult to obtain on the hillsides.

Milford is well provided with modern conveniences such as waterworks, an electric light plant (which is nearing completion), well macadamized streets, and a very complete system of cement sidewalks, but lacks what is perhaps most essential to good municipal sanitary conditions, namely, a properly constructed system of sanitary sewers. The public water supply, encouraging as it does the introduction of modern plumbing, renders such a system of sewers doubly necessary. At the present time there are a few storm water sewers, apparently poorly constructed and discharging at any convenient point. Several of these sewers receive sink drainage and other liquid wastes but only one receives fecal matter from water closets.

The above mentioned sewers may be briefly described as follows:

Sewer No. 1. This is a large double storm water sewer, built in 1875, in the northern part of the corporation. It drains about 500 acres of ground and a small pond to the northwest of the village. For the most part of its length this sewer is nearly parallel with and just south of Main Street. Near its outlet it crosses private property and discharges into a dry channel formerly used as a mill-race. At the time of inspection there was no flow at all from the outlet. While it would be preferable to have the outlet of this sewer extend to the river, it is not likely that it will at any time create a nuisance.

Sewer No. 2. No. 2 is built of 2-foot vitrified pipe, is about two

blocks long and discharges into the same dry channel which receives the discharge of Sewer No. 1. This sewer was constructed for the purpose of carrying off street drainage from Main Street. (Date of construction not known.)

Sewer No. 3. This is an 18-inch stone sewer in Locust Street and is about one block in length. (Date of construction not known.) It discharges into a cesspool about five feet in diameter and six feet deep, fairly well constructed of masonry. The overflow from this cesspool passes through a gutter toward the old mill-race into which it ultimately finds its way. Considerable sink drainage is discharged into this sewer and into the cesspool through the gutter above the sewer. This drainage undergoes rapid putrefaction, causing very offensive odors about the neighborhood. It was also noted that the sink drainage standing in depressions in the gutters tributary to the cesspool was also the cause of more or less nuisance.

All of the above sewers discharge into the old mill-race above a point where it has free outlet into the river. Below this point the mill-race channel is dammed at both ends, so that drainage finding its way into it has no way of escape.

Sewer No. 4. This sewer is a few blocks below Sewer No. 3. It is constructed of vitrified pipe, size not known but probably not over ten inches in diameter, and appears to be very unevenly laid. (Date of construction not known.) It receives sink drainage from a number of houses in the neighborhood, part of which remains in depressions caused by the unevenness of the sewer barrel and disseminates very disagreeable odors through several catch-basins. Such drainage as does not remain in these depressions is discharged into the old mill-race at a point where it accumulates and undergoes decomposition. The amount of drainage from this sewer in dry weather is quite small and not sufficient to maintain a standing pool of water at all times. In wet weather, however, considerable water does accumulate, which rapidly becomes very offensive. The depression at this outlet is likewise used for a dump upon which is occasionally thrown decomposable organic matter which adds to the nuisance already existing.

Sewer No. 5. This sewer is a few blocks south of Sewer No. 4 and is several blocks in length. It is made of vitrified sewer pipe, is ten inches in diameter, and discharges into the channel of the old mill-race at a point where the water has no escape. By act of council some years previous a saloon and bakery and ice-cream factory were permitted to discharge sink drainage and other liquid wastes into this sewer. The wastes are considerable in quantity and as they come from the outlet of the sewer have the appearance of a weak sewage. They collect in a stagnant pool about 100 feet long and 15 feet wide, there undergoing very offensive putrefaction. As seen at the time of inspection, the water was excessively foul and black and gave abundant evidence of active de-

composition by numerous gas bubbles on the surface. Conditions are somewhat aggravated by dumping of all manner of refuse in and near the pool. It is more or less sheltered by surrounding trees so that the water lies quiet and therefore undoubtedly forms a breeding place for great numbers of mosquitoes. The pool is also entered by a short 10-inch storm sewer; its length is not known and at the time of inspection there was no flow from the outlet.

Sewer No. 6. Near the southern end of the town in Water Street is a short storm sewer built about ten years ago, which discharges through a 2-foot outlet of vitrified pipe on to the river bottom about 100 feet from the water's edge. This sewer receives the storm water from two catch-basins located in the main square. At the outlet there was no appearance of domestic wastes and at the time of inspection there was but a very slight flow. It is claimed that in times of wet weather the water from this outlet flows into the cellar of a nearby saw-mill, causing more or less inconvenience.

Sewer No. 7. This sewer is also in the southern portion of the town and lies in Main and Garfield streets. It was built about ten years ago. It has a vitrified sewer pipe outlet about eighteen inches in diameter, discharging on to the river bottom about 150 feet from the water's edge. A channel has been excavated from the outlet to the river, but this is more or less clogged and permits some of the drainage to stand in stagnant pools. At the time of inspection there was but a very small flow which had the appearance of sink drainage. This waste accumulating in the channel above referred to and there undergoing putrefaction, gives rise to more or less disagreeable odors. It is known that this sewer also receives the discharge from several water closets and overflows from several cesspools.

It will be seen from the above description of existing sewers that Numbers 3, 4 and 5 give serious offense and of these three No. 5 is decidedly the most objectionable. The unsanitary conditions arising from the existence of these improperly constructed sewers can only be ultimately remedied by the construction of a complete system of sanitary sewers. With the growth of the town and the increasing use of the public water supply, the nuisances created by the discharge of sink drainage and other liquid wastes into gutters and existing storm sewers, finally finding their way to depressions in which they accumulate and undergo offensive putrefaction, will become more and more objectionable.

A temporary relief from the objectionable conditions obtaining might be effected in two ways as follows:

1st. The village could repair or reconstruct existing sewers, giving them even grades and extending their outlet to the river. This would involve considerable expense on the part of the village but not without some permanent return, for the sewers thus extended can be continued in use as storm water drains even after the introduction of a system of

sanitary sewers, and furthermore, it would be much preferable to have even storm water discharge into the river rather than into the dry bed of the old mill-race.

2nd. By order of the health officer all persons now discharging sink drainage or other liquid domestic or industrial wastes, could be prevented from so doing and be required to take care of such wastes in some other manner; e. g., by the construction of water-tight cesspools or receiving basins to be regularly emptied and cleaned.' This method of improving conditions would involve considerable hardship on individuals who would thereby be compelled to undergo the expense of constructing large cesspools and the additional cost of maintaining the same in good condition.

It is difficult to state which of the above suggested methods would be preferable from a local point of view, but in general it may be said that it would be best not to follow a course that would permit the discharge of sink drainage and similar wastes into storm water sewers, as this will cause those having the advantage of such privilege to combat the introduction of a proper system of sanitary sewers.

CONCLUSIONS.

(1) The village should be strongly urged to install a system of sanitary sewers that may receive all domestic and putrescible industrial wastes, as a means of preventing the accumulation of drainage on low land where it undergoes putrefaction and thus creates a nuisance. Such a system would also do away with the unsanitary privy vaults and cesspools which now pollute the ground water and form centers for the dissemination of disease by flies and other insects.

(2) The system of sanitary sewers should be so constructed that all the sewage may ultimately be conducted to a single outlet at a suitable site for the location of a sewage purification plant. Owing to the large flow of the Little Miami River at Milford, it is not likely that purification of the sewage would be necessary for a number of years; but the increasing tendency throughout the country to maintain the purity of surface waters would warrant the construction of the sewers in the manner outlined.

(3) For immediate relief from the nuisance and unsanitary conditions resulting from the accumulation of sink drainage and other local wastes in the old mill-race and other depressions, certain of the storm water sewers should be extended to the river and regraded where necessary. In cases where this is not feasible either because of impracticability or undue cost to the village, all persons should be required by order of the health officer to take care of all putrescible drainage on their own premises. Persons failing to abide by such order should be prosecuted.

A copy of this report was furnished to the health officer, and the chairman of the council committee of Milford, July 16, 1907.

REPORT OF INVESTIGATION OF A NUISANCE AT NEW BREMEN.

While in New Bremen on July 8, 1907, the attention of the assistant engineer was called to a nuisance created by the discharge of wastes from a creamery into a drainage ditch having no natural summer flow. An investigation was made in which the assistant engineer was aided by Mr. E. G. Conradi, mayor, and Dr. Edward M. Phelps, health officer. The following report was submitted:

To the east of New Bremen is a large creamery, owned by Louis Hinke, having a capacity of from 2,700 to 3,500 pounds of butter per day. The liquid wastes resulting from the washing of churns, milk cans, and various apparatus, and also the drainage from the floors are discharged into an open drainage ditch which during the greater part of the summer has no natural flow. This ditch passes around two sides of farm land owned by Henry Vanderhorst and within several hundred feet of the latter's residence. The length of the ditch abutting on the above property is about 800 feet. The ditch is not in good repair and contains numerous depressions which permit the wastes to accumulate in pools, there undergoing very active putrefaction.

Though conditions could be somewhat improved by regrading the ditch, the owner of the land objects to this method as he believes it will not give entire relief, and furthermore, is unwilling to assist in the work.

The only method of securing permanent relief from the disagreeable conditions now existing is to install a purification plant at the creamery, through which all of the wastes may be passed before entering the ditch. Such a plant might consist of two or more sand beds with area sufficient to permit a rate of filtration not exceeding 25,000 gallons per acre per day. This rate could be materially increased by giving the wastes a preliminary treatment in septic tanks. The most economical construction and the rates best adapted to the purpose cannot now be stated as sufficient data does not exist upon which such figures could be based. It is believed that the owner would be willing to permit a representative of the State Board of Health to carry out experiments on the purification of creamery wastes at his establishment and would possibly be willing to pay for the cost of construction of an experimental plant.

July 23, 1907, a copy of this report was funished the health officer of New Bremen, and a letter was addressed to the proprietor of the creamery stating that the Board would be very glad to co-operate with him in introducing and operating a disposal plant for taking care of his waste product.

REPORT ON INVESTIGATION OF A NUISANCE IN PERKINS TOWNSHIP, ERIE COUNTY, NEAR SANDUSKY.

On September 16, 1907, a letter was received from Dr. M. J. Love, health officer of the board of health, Perkins Township, Erie County, requesting an investigation of a nuisance emanating from a slaughter house. The assistant engineer visited the locality on October 15, 1907, and made an investigation in which he was assisted by Mr. Henry Boyington, president, and Dr. M. J. Love and Mr. F. N. Hills, representing the board of health. The following report was submitted:

The slaughter house in question is owned and operated by Charles K. Knapp, of Sandusky. The property on which the slaughter house is located borders the southern corporation limit of Sandusky. The establishment is one of fairly large size. An approximate average of the number of animals slaughtered is given as follows:

Cattle	50 per week.
Hogs	50 " "
Sheep	25 " "
Calves	25 " "
Total	150 per week.

The number of animals killed in the summer is probably twenty-five per cent. greater than the above estimate, and the number killed during winter about twenty-five per cent. less. The buildings are rather rude wooden structures about 400 feet from the highway and possibly 600 feet from the nearest residences. As a result of previous complaints the floors have been made of concrete throughout and are apparently well drained. The walls and ceilings are unfinished and practically all the woodwork is of rough undressed lumber. This feature makes cleaning difficult and causes the more rapid accumulation of dirt. In fact everything, excepting the floors, had the appearance of being plastered with black grease. Lighting and ventilation seemed to be fairly good but there are opportunities for improvement in this direction. The ground immediately surrounding the buildings was far from being neatly kept; bones, old grease boxes and barrels, and more or less offal were to be seen lying about. The liquid wastes, of which there are large volumes, are discharged into an abandoned quarry north of the buildings and about 300 feet from the highway.

Many and bitter complaints are received every year by the board of health of the township from nearby residents who state that with certain wind conditions the slaughter house odors are very nauseating, and it becomes necessary to keep all windows and doors shut. It might be noted in passing, that a few of the nearby residents do not complain, but this

must be attributed to their lack of sensitiveness rather than to the non-existence of odors.

The conditions productive of odors may be enumerated as follows:

(1) Refuse of a putrescible nature lying on the ground near the buildings.

(2) Slaughtering of animals.

(3) Rendering of tallow.

(4) Rendering of scraps and offal.

(5) Discharge of liquid wastes into the old stone quarry.

To present an idea of the extent to which the above conditions may create a nuisance and the manner in which such nuisance may be abated, they will be discussed separately.

(1) The accumulation of putrescible refuse and offal on the ground near the buildings is simply the result of carelessness and neglect. The owner should be held to strict account for the neatness of the ground surrounding his buildings. In justice to the owner, however, it may be said that conditions in this respect are better than they have been in previous years.

(2) The dressing of animals just after being killed is attended with considerable odor which to many is nauseating. This odor is unavoidable but it does not persist for a great length of time and is not believed to carry far.

If the flooring is loosely laid or is of an absorbent material it will permit the retention of liquids and slime. If the general construction of the killing rooms and appurtenances is rough and filled with crevices and corners, opportunity will be afforded for the adherence and lodgment of particles of animal matter. Under such conditions the liquids, slime and particles of animal matter will undergo decay attended by very disagreeable odors that may be carried for considerable distances. As before stated, and to the credit of the owner, the floors have all been paved with concrete well graded toward catch basin drains and it appears that at the end of each day's work all of the floors are flushed clean. On the other hand, the interior woodwork, killing pens, etc., are all of undressed lumber, and also there is more timber construction than is advisable about a slaughter house. This no doubt has the effect noted above, though at time of inspection so many other odors were predominant that it was impossible to obtain direct evidence. While reconstruction of the building at the present time would undoubtedly prove a hardship to the owner, yet he should be required, when the present buildings need renewal, to introduce masonry construction wherever possible; and where wooden construction is essential this should be dressed timber. The floors, as at present, should be of concrete, and the walls for a height of five feet should be wainscotted with cement mortar, glazed tile, or enameled tile.

(3) Rendering of tallow is conducted in a small dilapidated wooden out-building and is productive of exceedingly offensive odors. The

process used is primitive, and throughout the material is exposed to the air. Matters are made somewhat worse by the carelessness of the operator who frequently permits the fat to partially decay. Tallow rendering is not, strictly speaking, a part of the slaughter house operation, since the rendering is done by an outsider to whom the out-house is rented. Since tallow rendering, even when most carefully conducted, is productive of disagreeable odors, the process should be altogether abandoned. At the time of inspection, the owner of the slaughter house expressed his willingness that this should be done.

(4) The rendering of scraps and offal is a process similar to certain processes in use for the reduction of garbage and may be described as follows: The scraps and offal are placed in closed tanks and cooked for five or six hours under steam pressure. The cooked material is then pressed under very great pressure for the purpose of extracting water and grease. The liquids are conducted to settling tanks, from the surface of which the grease is skimmed. The pressed material or tankage as it is called is subsequently dried and sold as a fertilizer base. The grease is also sold, being used in processes where a low quality of grease is suitable. The liquid remaining in the settling basins after the grease has been removed is discharged into the waste drain, and like the other liquid wastes contains large quantities of putrescible organic matter. The cooked tankage has a very disagreeable odor, though not as offensive as that produced by the rendering of tallow.

Wherever rendering of scraps and offal is conducted in proximity to dwellings, complaints are almost certain to arise. It would be possible to do away with odors from the process to a very great extent if some form of enclosed apparatus were used similar perhaps to the Edson process of garbage reduction. It might, however, prove cheaper and more efficient to enclose the present apparatus in a separate room artificially ventilated and so arranged that the vitiated air would be passed through the boiler fires.

(5) The entire liquid wastes of the plant are discharged through a tile drain into an old limestone quarry some 100 feet distant. These wastes are derived for the most part from the killing and dressing rooms and contain blood, cleanings from intestines, hair, small particles of solid animal matter, and a great quantity of dirt of various sorts. The present method of disposal has been in use since April, 1907. Previous to that time the wastes were permitted to flow out over the surface of the ground, to be absorbed by the soil and evaporated into the air. This method gave rise to such vigorous complaint that some other method became imperative. Connection with the sewerage system of Sandusky was contemplated, but the city refused to bring the sewers to the property line, and the cost to the slaughter house owner for making connection to existing sewers proved prohibitive. Under the circumstances the discharge of the wastes into the quarry seemed the most feasible method of disposal. It

was hoped that the ground water in the quarry would sufficiently dilute the wastes to prevent nuisance. Such, however, was not the case and at the time of inspection the quarry was filled to the brim with a black malodorous liquid undergoing active putrefaction as evidenced by thousands of gas bubbles at the surface.

The quarry is roughly 150 feet square and about ten feet average depth; the capacity, therefore, is approximately 1,700,000 gallons. The wastes enter at the south side after flowing for a short distance through an open ditch. The quantity of wastes entering no doubt closely approximates the amount of water used. The latter amount was obtained for three month periods from meter readings made by the Sandusky water department and are given as follows:

October to January, 1906............	52,100 gals.	570 gals. average per day
January to April, 1907...............	82,300 "	915 " " " "
April to July, 1907....................	89,800 "	988 " " " "
July to October, 1907.................	426,000 "	4630 " " " "

No analyses of wastes are available but from appearances they are very high in organic matter, no doubt many times stronger than domestic sewage. Until recently small particles of solid matter and grease were separated out by trapping in a large hogshead but the hogshead became unfastened and floated off. At the time of inspection, small particles of solid matter and a scum of grease were observed on the lee side of the quarry near the bank. The quarry in its present condition undoubtedly constitutes a serious nuisance, and the continued discharge of wastes therein will rapidly make matters worse.

There are but two feasible ways of disposing of the liquid wastes without creating a nuisance; namely, by purification, using methods similar to those in use for sewage disposal, or by making connections with the Sandusky city sewers. The first method would require a plant costly to build and costly to operate, since there is but little suitable material nearby and it would be impossible to get a gravity flow from the slaughter house to the plant without pumping or unless the buildings were raised six or eight feet. Connection with the Sandusky sewers would prove by far the cheaper and more satisfactory method. It would be necessary, however, to carefully remove by catch basins and screens all particles that would tend to lodge in and clog the sewers, or would be detrimental to sewage purification. An effort should be made by the owner of the slaughter house and the township authorities to induce the city to carry its sewers along its southern corporation line to a point in front of the slaughter house property.

SUMMARY AND CONCLUSIONS.

The foregoing may be briefly summarized and concluded as follows:

Refuse of a putrescible nature lying on the ground near the slaughter

house is the result of carelessness and negligence and should be summarily abated.

The rendering of tallow on the premises is the cause of extremely disagreeable odors and should not be permitted.

The rendering of scraps and offal is also productive of offensive odors. The entire equipment for conducting this process should be enclosed in a tight artificially ventilated room and the vitiated air therefrom passed through the boiler fires.

The discharge of liquid wastes into the stone quarry has converted the latter into a foul open cesspool which will rapidly become more offensive with the continued disposal of wastes therein. An effort should be made by the owner of the slaughter house, in which he should be assisted by the Perkins Township authorities, to secure connection with the Sandusky city sewers. In discharging the wastes into sewers, however, every precaution should be taken to prevent the entrance of substances that will produce clogging or interfere with sewage purification. Failing to obtain sewer connection, the only remaining method of disposing of the wastes is by means of a suitably constructed purification plant.

If when the above outlined procedure has been carried out, objectionable odors still exist, the township's only recourse will be to insist on a reconstruction of the slaughter house buildings along modern and approved sanitary lines. Further, it would be advisable for the local health authorities to oppose the erection of additional buildings unless so constructed.

November 7, 1907, a copy of this report was furnished the health authorities of Perkins Township, and they were advised that with the evidence contained in this report they could no doubt prove a nuisance and compel the owner of the slaughter house to abate it, or to cease slaughtering at that point. They could bring action themselves, or the matter could be brought to the attention of the grand jury and an indictment secured there. Their attention was also called to the authority of the county commissioners to abate the nuisance by the appointment of an inspector of nuisances, who would have authority to enforce the laws against nuisances of this character, as per Sections 6920a *et seq.*

REPORT ON AN INVESTIGATION OF AN ALLEGED POLLUTION OF PORTAGE CREEK IN PERRY TOWNSHIP, WOOD COUNTY.

August 30, 1907, a request was received from the health officer of Perry Township, Wood County, for an investigation of a nuisance alleged to be caused by the pollution of Portage Creek in that county by the

discharge of polluting wastes by the city of Fostoria. It was alleged that the waters of the creek were polluted to such an extent as to be injurious to the people living along the stream and also to the stock.

One of the special assistant engineers, on September 9, 1907, made an inspection and the following report:

Portage Creek is a small stream flowing into Portage River and draining the city of Fostoria and surrounding country, a total drainage area of about thirty square miles. In the summer time, during periods of drought, the creek appears as a sluggish stream and under present conditions in Perry Township is a succession of pools. At the present time the water is colored red by iron, oily wastes are to be noted on the surface of the stream and evidences of sewage contamination are marked. A careful examination of present conditions showed that while there is no particular offensiveness due to odors, there is marked pollution relating chiefly to the aesthetic phase of the question and the probability that the stream is not suitable for the watering of stock.

Inspection revealed two principal sources of pollution:

1. Acid iron pickling liquors;
2. Partially clarified sewage.

PRESENT POLLUTION OF STREAM.

ACID IRON PICKLING LIQUORS.

The most marked pollution of the stream and one affecting the appearance and potability of the water is that due to the discharge of acid iron wastes. In 1906, a new factory was established in Fostoria, known as the Seneca Iron & Manufacturing Company, engaged in the manufacture of iron nails. In the process of manufacture, the nails are dipped in dilute sulphuric acid to effect the removal of rust, this process naturally involving a liquid waste containing both free acid and iron.

In an interview with the superintendent of the plant, Mr. E. A. Henry, it was learned that the acid consumption averages about 18,000 pounds per month, or 650 pounds daily, the amount of scale removed per month being 5,000 pounds or 167 pounds daily. On a ten hour operating basis the acid iron pickling liquors comprise daily the spent acid from two acid tubs, each of a capacity of 1,795 gallons, together with the discharge from a rinsing tub having a capacity of 898 gallons. The total volume of mixed strong rinsing and pickling liquors daily from this source is obviously about 2,700 gallons. In addition to this volume of acid wastes, there is a large amount of dilute rinse liquor, originating from the practice of rinsing the rods with a hose, the rods being suspended over the pickling tubs just subsequent to their removal from the acid bath. From available information, it appears that the volume of water used for this purpose is about 7,500 gallons daily, and this amount combined with the 2,700 gallons of strong pickling and rinsing liquors constitute a total

daily discharge of approximately 10,000 gallons for ten hours. This estimate, while rough, appears to be sufficiently precise for the purpose at hand.

Since the plant has been in operation and until recently, the wastes from the mill have been discharged into the city sewers leading to the sewage plant. At the present time, however, a new 18-inch sewer is under construction to convey the acid wastes to the sewage plant. When inspected, consequently, the acid liquors were being discharged into Portage Creek within the city limits, with a result that when reaching Perry Township the waters of the creek assume a strong reddish brown color, due to the oxidation of the iron. It is to be noted particularly that on the day of the inspection the flow in the creek above the Fostoria sewage plant practically consisted entirely of the rinse liquors from the nail works.

PARTIALLY CLARIFIED DOMESTIC SEWAGE.

The second source of pollution of Portage Creek as noted on this inspection is caused by the discharge by the city of Fostoria of but roughly settled sewage.

To obtain a knowledge of existing conditions, it will be advisable to review briefly available evidence as to the method of operation of the Fostoria sewage purification plant and its general efficiency. In connection with the Board's special investigations of sewage plants, it was brought out that the sewage of Fostoria from what is known as Sewerage District No. 1, reaching the sewage plant through a 6-foot sewer draining the main portion of the city, was being allowed to discharge into Portage Creek direct subjected only to the clarification effected by its retention in a, so-called, dry weather flow drop. It was further found that once weekly it is the custom to cause the settlings collected in the flow drop to pass to the reservoir, eventually to be pumped to the sewage plant. The sewage from the other sewage districts of Fostoria reaching the plant through an 18-inch sewer, appears to be pumped and treated at the plant at all times. In view of the above conditions as to the operation of the sewage purification plant, under date of September 8th, 1906, the Board advised the board of public service of Fostoria that the discharge of sewage from Sewerage District No. 1 directly into the creek without treatment should be discontinued, except as at such times when the creek was in flood, and further that more care and attention should be paid to the operation of the sewage plant, with a view to increase the efficiency of the filters. Apparently nothing has been done to prevent the discharge of sewage from Sewerage District No. 1 and as a result there is effected a marked and serious pollution of Portage Creek, and as found during this inspection, waters of the stream comprise practically only the sewage discharged from Sewerage District No. 1, drainage from the iron mill and some possible seepage from the city itself, together with the purified sewage effluent.

An inspection of the effluent from the sewage plant indicated that the purification obtaining was sufficient to afford a satisfactory non-putrescent effluent, so that no serious pollution is to be attributed to the discharge of an imperfectly purified sewage effluent.

PAST INSPECTIONS AND ACTIONS OF BOARD.

From former reports of the Board, it appears that the question of the pollution of Portage Creek by the city of Fostoria has been the subject of investigation several times during the past 14 years. In 1893 conditions were such, owing to the discharge of crude sewage from the newly constructed sewerage system, that the purification of sewage was contemplated and with the promise of the speedy construction of a purification plant, it was thought that all further possibility of nuisance would be removed and that the remonstrants would thus be satisfied. Shortly afterwards plans were drawn for a sewage purification plant and the same were approved by the Board on April 23, 1896. Generally speaking, the plant comprises settling tanks for the storage of the sewage, a sludge well, pump, and a filtration area embracing about twenty-four acres, two of which were formed into artificially constructed sand filters, about six acres were trenched with sand and underdrained, the remaining area was tiled; the purification of sewage being perhaps incidental to the irrigation of the land for crops.

The construction and operation of the sewage plant served for a time to abate the nuisance and the pollution of Portage Creek. In 1900, however, complaint was made to the Board that the sewage from Fostoria was again causing a serious nuisance by polluting Portage Creek. An investigation of conditions was ordered by the Board and it was found that while the sewage plant was constructed substantially in accordance with original plans, yet for several years the plant had not been in service and the raw sewage from the city was being discharged into the sluggish creek, to the great annoyance of the farmers living along its banks. It was further brought out that the discontinuance of the operation of the plant was the result of the desire to cut to a minimum the cost of operation. At that time immediate steps were taken by the Board and the Fostoria authorities agreed to undertake at once such repairs and alterations as would be necessary to place the plant on a better operating basis.

The filing of a suit by the residents of Perry Township was prevented by the following recommendations embodied by the Board in a letter to the Fostoria officials:

"First. That the local authorities of Fostoria be notified that they must immediately put in order the disposal plant as approved by the State Board of Health, and that in the future the same must be constantly in use, and that sufficient expert attention be at all times given to the plant, so that no pollution occurs from the passage of sewage into the creek below

"Second. That the inhabitants of Perry Township be informed of the action of this Board in the matter and assurance be given that all will be done to prevent a continuance of the pollution of the stream."

REMOVAL OF POLLUTION.

IRON WASTES.

One serious source of pollution of Portage Creek at the present time is the discharge of acid iron wastes. It appears, however, that the discharge of these wastes directly into the creek is of a temporary nature only and that shortly they will reach the Fostoria sewage plant through the 18-inch sewer now under construction, and hence will be discharged into the creek only after purification. Assuming the volume of these wastes at 10,000 gallons daily and the flow of the 18-inch sewer at about 300,000 gallons in dry weather, it is evident that the wastes will comprise 3.3 per cent. of the sewage flow in this sewer (corresponding to present conditions when the sewage from Sewerage District No. 1 is not pumped). Should the city pump the entire dry weather flow of sewage, the total daily sewage flow, estimated as closely as possible from available information, will probably be in the vicinity of 750,000 gallons, and under these conditions the iron wastes will be only about 1.3 per cent. of the total sewage flow. If thoroughly mixed, the acidity of these wastes will probably be neutralized by the hardness constitutents of the sewage, so that there will probably be no danger of destroying the nitrifying organisms in the sewage filters. There might possibly be some difficulty owing to the clogging effect of the iron, but as the areas at Fostoria at the present time and always are more or less clogged (cleaning taking place once annually only), it is not thought that the operation of the plant will be seriously interfered with by the admission of these acid iron wastes, unless they should be largely increased in amount.

It is evident from the above considerations that the present condition of Portage Creek, particularly the visible pollution due to acid iron wastes, is one of a temporary nature and one which will be removed as soon as the wastes are again discharged into the city sewers and are treated at the city sewage plant.

In case the admission of the wastes into the sewers tends to make difficult the operation of the sewage plant, the recovery of copperas suggests itself and the neutralization of the weak rinse liquors.

DOMESTIC SEWAGE.

Under dry weather conditions, such as were prevailing on this examination, it is entirely practicable to cause the sewage from the 6-foot sewer to be discharged into the storage reservoir at the sewage plant, eventually to be pumped to the sewage filtration area. That this sew-

age has not been pumped for some time past and that no attention has been paid to the recommendations of the Board under date of September 8th, 1906, appears to be clearly indicated. The pollution of Portage Creek from this source is serious and one which can readily be prevented if the city authorities are willing to increase the cost of operation of the sewage plant sufficiently to insure its proper operation at all times.

CONCLUSIONS AND RECOMMENDATIONS.

From a study of present conditions in Portage Creek it appears that a nuisance exists, due to the pollution of the stream by the city of Fostoria. Evidence at hand indicates strongly that the waters of the creek under the extreme dry weather conditions now prevailing are rendered unfit for domestic use, and as well for the watering of stock; are unsightly and particularly because of the acid iron wastes, are seriously polluted from an aesthetic standpoint.

In regard to the pollution by iron liquors, it appears that these wastes will soon be discharged into the sewers and will reach the creek only after treatment at the sewage plant, a process which will no doubt remove the acidity and the greater part of the iron. It further appears that at times of high water and except at times of drought stages such as prevail at the present time, the dilution afforded is sufficient to overcome the objectionable effect of the iron liquor on the appearance of the stream, which at times is turbid and normally of a reddish brown color, due to suspended clay.

The removal of the pollution by a part of the sewage of Fostoria can be readily and practically accomplished, provided the operation of the city's purification plant be fully carried out, as should be the case under dry weather conditions. It would seem advisable with a view permanently to better conditions of Portage Creek in Perry Township to bring sufficient pressure to bear on the Fostoria authorities, by legal means, if necessary, to compel them to purify all the sewage of the city under dry weather conditions.

REPORT ON PROPOSED SEWERAGE FOR SCHOOL HOUSE AT AMHERST AND EXISTING SEWERAGE OF THE VILLAGE.

On September 20, 1907, a letter was received from Mr. H. M. Clark, superintendent of construction, Amherst, asking for advice regarding a certain system of sewage disposal for a school house now under construction for the Union School District, Amherst. The engineering department made a report in regard to this matter under date of Sep-

tember 21, 1907, stating that further information regarding water consumption, location and topography were required. A letter was sent by the Secretary, requesting information regarding these points and Mr. Clark replied on October 8th. In view of the desirability of full information regarding the problem, especially as the village of Amherst is not sewered, the writer visited the village on October 22, 1907, with a view to learning further information regarding the school house sewerage and the present status of the somewhat meager sewerage facilities of the village of Amherst.

SEWERAGE OF NEW SCHOOL HOUSE.

The school house under control of the board of education, drawing pupils from what is known as the Union School District was destroyed by fire some time ago and a new stone structure is now being built.

The school house is situated in the southern part of the village in the center of the most thickly built up portion. The building is located on the higher land comprising the village; about 600 feet from the same, the land slopes rapidly to Beaver Creek. In the absence of a general system of sewerage for the village, the board of education proposed to install a cesspool for the reception of the sewage of the school house, the effluent from the same to discharge into a ravine leading eventually to Beaver Creek. By letter the board was informed that the system of sewerage as proposed would afford only a clarification of the sewage, and that unless some means were provided for the purification of the effluent there was a strong probability of a nuisance at the point of discharge of the effluent.

From available information it appears that it is the intention of the board of education to install modern plumbing fixtures in the new school house, requiring, of course, an ample water supply for flushing purposes. As a source of water supply it is proposed to use two cisterns for rain water, with a total capacity of 31,400 gallons. The population of the school house is placed at 500, and with a low estimate of 10 gallons per capita, the daily consumption, for the proper operation of modern sanitary conveniences, would be about 5,000 gallons, the school house being used daily from 8:00 A. M. until 3:30 P. M. The original estimate of the board of education on water consumption appears to have been somewhat vague, and was placed at 500 gallons daily; it is evident that this figure is entirely too low. Even under a most restricted use of water, available information appears to indicate that the consumption would be at least 5,000 gallons per day and possibly 7,500 gallons.

PRESENT CONDITION OF SEWERAGE IN VILLAGE OF AMHERST.

There are practically no sanitary sewers in Amherst, although several storm water drains receive considerable sewagic material. The

attention of the State Board of Health was first directed to the condition of the Amherst sewers in a letter received November 8, 1905, from Dr. W. Foster, health officer. On December 5, 1905, the engineer of the Board visited the village and reported substantially as follows:

The village of Amherst, with a population of about 2,000, is located in Lorain County, on the watershed of Beaver Creek, a small intermittent stream, at a point on the stream about three miles south of Lake Erie. In 1905 the sewers constructed comprised an 18-inch tile in Elyria Street, the principal business street of the village, extending about 1,000 feet from the corner of Church Street and discharging into Beaver Creek, near the Elyria Street bridge. Although built primarily as a cellar and storm water drain, considerable domestic sewage was being discharged and created a nuisance. At Beaver Creek, moreover, there was a pool from which water was pumped at intervals for flushing streets and the water due to the discharge of the Elyria Street sewer was of such a character as to cause a nuisance during flushings. Considerable odors were also found to emanate from the storm and cellar drain sewer, in view of its illegitimate use for domestic sewage, and it was further found that plans for this sewer outlet were never submitted to the State Board of Health for approval.

In view of these conditions, on December 20th, 1905, the Board disapproved the outlet for the 18-inch tile sewer in Elyria Street and notified the board of trustees of public affairs that the discharge of unpurified sewage into Beaver Creek should cease by December 1st, 1906. The Board advised also, for the betterment of the health of the community, that a suitable sewerage system with purification works should be installed at the earliest possible date. Apparently no interest was taken in this matter and at the present time similar conditions prevail regarding the illegal use of storm drains for the disposal of domestic sewage.

At the present time, in addition to the 1,000 feet of 18-inch tile in Elyria Street, the sewers of the village comprise about 3,100 feet of a storm water drain extending from the Lake Shore Railroad Depot in a northwesterly direction and discharging into Beaver Creek at a point about 500 feet below the outlet of the Elyria Street sewer. This sewer comprises about 1,500 feet of a 3 x 4-foot masonry culvert, discharging into two 24-inch vitrified sewer pipes for a distance of about 500 feet, thence into an open ditch about 100 feet long, thence through about 500 feet of 24 inch tile, thence through about 100 feet of open ditch and 500 feet of 24-inch tile to a ravine leading to Beaver Creek. A number of privies are located on this sewer and the open ditches constitute a considerable nuisance. In addition to these two sewers, there is about 600 feet of an 18-inch tile near the proposed school house, discharging into a ravine directly west of the school house and leading to an arm of Beaver Creek. All of these sewers are primarily for cellar drainage and storm water.

CO-RELATION OF SEWERAGE OF SCHOOL HOUSE AND VILLAGE.

While in Amherst, the writer discussed with the village officials the question of the sewerage of the town, and that of the new school house. One of the members of the board of education, Dr. Rogers, was also interviewed.

It appears that at the present time there is considerable agitation in the village regarding sewerage, but the general sentiment appears to be that a water supply should first be installed. It was stated that some correspondence has been carried on between the village and the city of Elyria, with a view to obtaining water from that source. No definite arrangements have been made, however. The writer, in company with the mayor, superintendent, Mr. H. M. Clark, and a local business man made a thorough inspection of existing sewers and looked over a possible site for a sewage purification plant, the advisability of the latter being impressed upon the officials in case plans for sewerage were undertaken. Local sentiment for sewerage appears to be fairly strong, but at the present time there appears to be no definiteness in the decision for either a water supply or a sanitary sewerage system.

The disposal of the sewage from the new school house is a problem which appears to be related to the sewering of the entire village. In the probable absence of a sufficient water supply for the school house to admit of the proper operation of sanitary conveniences, and further in view of the probability of a universal sewerage system in the near future, it would appear, and such was the trend of discussion with the village officials and with Dr. Rogers of the board of education, that it would be cheaper and on the whole a better solution of the problem to construct for the school house a large vault, disposing of the sewage of the school on the semi-dry system until in the future the sewering of the village and the installation of a general water supply would provide ample facilities for operating modern sanitary conveniences. In case the new water supply and the sewering of the village were not to be accomplished in the near future, the opening of the school house probably not being until the school year of 1908, it would be possible to deal with what sewage the school house would produce by means of a septic tank and sand filtration, the plant to be located in a ravine about 1,000 feet west of the building. From available information, however, it would appear doubtful if sufficient water would at all times be available for the use of the school house and on the whole, it would appear better to construct for temporary use a vault of suitable size, the same to be cleaned when required.

CONCLUSIONS.

Conditions in the village of Amherst as to sewerage are practically the same as found by the engineer of the Board in the latter part of 1905.

There are three sewer drains and storm sewers, all of which receive sanitary wastes and contribute materially to the pollution of Beaver Creek and in the case of the sewer on Springfield Street constitute a decided nuisance, since northwest of Cleveland Street and extending west to the creek there are considerable stretches of open ditches. The sewerage of the new school house is a problem closely related to that of the village, and in view of the probable sewerage of the entire village in the not far distant future, it would seem wiser to construct a vault for the retention of the wastes from the school house, especially in view of inadequate water facilities for the operation of modern sanitary conveniences, and also in view of the considerable saving in cost thus effected and the necessity of a sewage purification plant for the village, when eventually the latter shall be sewered for sanitary purposes.

In case, however, the sewering of the village will not take place for some years, a septic tank followed by sand filtration and located in a ravine about 1,000 feet west of the new school house would appear to be the proper solution of the problem provided, however, sufficient water is available for flushing purposes, an amount estimated at from 5,000 to 7,500 gallons daily, and a quantity far in excess of that anticipated by the board of education, which apparently has figured on the small amount of 500 gallons daily and is depending upon a rain water cistern with a capacity equivalent to about six days supply.

A copy of this report was sent to the superintendent of construction on November 2, 1907, and he was advised that unless the village of Amherst would take immediate steps toward providing a sewerage system with sewage purification works, which would accommodate the school house, it would be necessary for the board of education to provide a sewage disposal plant for the school.

The report was also sent to the mayor and council of Amherst and they were advised that the village should at once take steps to provide a proper sewerage system with purification works for Amherst.

REPORT ON PROPOSED WATER SUPPLY AND SEWERAGE FOR SCHOOL HOUSE AT DILLONVALE.

On June 24, 1907, there was received from Mr. W. M. Whitley, clerk of board of education, Dillonvale school district, a request for permission to construct a sewer from a new school house into Short Creek. The chief engineer visited Dillonvale on July 3, 1907, made an inspection of conditions, and also made an investigation into the question of proposed water supply for the same school house. The following report was submitted.

Dillonvale is a village of about 2,500 inhabitants, located in the

southeastern corner of Jefferson County on the Wheeling & Lake Erie Railroad, about five miles from the Ohio River. The village is distinctly a coal mining town, and it is inhabited largely by the employes of the Wheeling & Lake Erie Coal Mining Company. The village is located adacent to a small stream known as Short Creek, which enters the Ohio River near Warrenton. The average dry weather flow of this stream is probably about four cubic feet per second.

The village has no public water supply nor sanitary sewer system. It is said that there are no modern water closets in the town. At the present time there are two sewers which have been built by the village. The upper sewer is eighteen inches in diameter and begins at a point 200 or 300 feet west of the railroad station and 600 feet north of Main Street and extends to the creek, a distance of 1000 feet or more. At the time of inspection, the only flow consisted of a small amount of sink drainage. The sewer is built primarily for storm water purposes, but is being tapped into for household purposes. The lower sewer is twelve inches in diameter and is 500 or 600 feet down stream from the upper sewer. It apparently receives a considerable amount of sink drainage, and the outlet causes a distinct nuisance along the bank of the stream.

Proposed Water Supply for School House. A new school house, to accommodate 300 to 350 pupils, is being built by the Dillonvale school district. The building, which is located on Main Street, about midway between the above mentioned sewers, is about half completed. There is a well on the site of the school building, the use of which is contemplated. It is also proposed to use a spring on a hill across the creek from the school house. Samples from the well at the school house site and also from the spring on the hill, were collected by the clerk of the board of education, according to directions of the chief engineer, and analyzed in the laboratory of the State Board of Health.

The results of the analyses (although it is doubtful whether the bacterial analyses can be given much weight on account of manner in which samples were handled) indicate that the well at the school house should not be used, but that the spring on the hill would be safe and satisfactory for supplying the school house with water.

Proposed Sewer for School House. The board of education proposes to install a modern system of plumbing in the school house and to discharge the sewage into the above described 18-inch drain, which leads into the creek not far from the school building.

Disposal of the sewage from the school house in this manner would undoubtedly create a distinct nuisance along the edge of the creek and would be opposed to correct sanitary principles. The construction of this sewer, therefore, should be disapproved.

It is contended by the clerk of the board of education that the creek water is already contaminated by mine drainage. This drainage, however, cannot be considered as very objectionable from a sanitary stand-

point, as a sample of water from the creek above town but below the mines, showed the absence of sewage bacteria.

CONCLUSIONS.

(1) The well on the site of the school house should not be used.

(2) The spring on the hill across the creek is safe and satisfactory as a source of supply for the school house.

(3) The proposed sewer from the school house, to discharge into an existing storm water drain and thence into the creek, should be disapproved and the board of education advised to take means for treating the sewage before discharging it into the creek. A small cesspool or tank with filters of coke, stone or coal would probably be efficient. The board of education may obtain more detailed information from the State Board of Health in regard to the construction of this tank, upon request.

(4) The village authorities at Dillonvale should at once take steps toward providing a suitable sewerage system, with sewage purification, for the entire village. A public water supply should also be installed. If this is not done, the wells in the village, (which is quite thickly settled) will undoubtedly become dangerously contaminated. It is probable that many of these wells as shown by the analysis of the well on the school house site, are badly contaminated at the present time.

August 5, 1907, a copy of the report was sent to the clerk of the board of education, Dillonvale school district, and the hope expressed that a small sewage purification plant would be put in to take care of the drainage from the school house.

The report was also sent to the mayor of Dillonvale, and he was urged to have the village take up the question of a new water supply and sewerage, which appeared to be greatly needed to insure the healthfulness of the village.

REPORT ON SANITARY INSPECTION OF PUBLIC SCHOOL BUILDING AT WEST MANSFIELD.

On April 22, 1907, a letter was received from Dr. H. A. Skidmore, health officer of the village of West Mansfield, stating that the sanitary condition of the public school building was not satisfactory and requesting an examination by the State Board of Health. The assistant engineer visited West Mansfield on April 26, 1907, and with the assistance of Dr. Skidmore, made the examination requested and submitted thereon the following report:

The village of West Mansfield has a population of about 1,000 and is located in the extreme east-central portion of Logan County. The village is primarily a farming center though it also supports a few industries, such as a stave factory and several tile works.

The public school building is in the northern part of the built-up portion of the town, on a lot about two acres in area. The school lot does not drain well, and as a result water stands on certain portions during nearly the whole school term. Children playing on the grounds during recess frequently get their feet wet and are, therefore, liable to colds and sore throat. The land could be drained, so as to be dry nearly all the time, by the use of field tile, which would discharge into the nearest ditch or natural water-course. It would also be advisable to surface the ground with mixed sand and gravel, if available, as water passes through this material rapidly, and thus the surface would be dry a very short time after rainfall.

The building is of brick and is constructed for the most part in an attractive and substantial manner. The number of children at present enrolled is 198. There are six school rooms, each containing two grades ranging from the first to the twelfth. The main portion of the building was built fifteen years ago and contains four rooms. It is divided through the center by a hallway, from which a stairway leads to the upper floor (see Diagram 1). Both the old and new portions of the building have two stories. The new portion is in the rear of the north side of the old and was built some ten years later. The basement extends under the new portion only, so that the lower floors in the old are very close to the ground. There are no play-room facilities in the basement, which is used entirely for the heating apparatus and the storage of coal. In order that the building may be kept perfectly free from dampness it should have a well-constructed basement. Such a basement would also furnish play-room facilities which the children could use during inclement weather. At present during bad weather they are required to spend their recesses in the halls and school rooms. While such a basement is not an immediate necessity in the case of the West Mansfield school, it should be added after the more important alterations have been made.

ROOMS.

All of the class-rooms are very nearly the same shape and size; that is, 35 feet long by 24 feet wide and 14 feet from floor to ceiling. The rooms on each floor are arranged as shown on Diagram 1. The air space in each room is 11,760 cubic feet. The number of pupils in one room varies from 21 to 53; the corresponding air space per pupil would, therefore, vary from 222 to 563 cubic feet. The floor space per pupil varies from 16 to 40 square feet. Authorities on school sanitation are generally agreed that the former figure should not be less than 200 cubic feet and the latter not less than 15 square feet. From this it will be seen that the rooms are amply large.

Floors. The floors of the rooms are of yellow pine, a material which splinters readily. In the new part of the building the wood seems to be of a fairly good and close grain quality, so that the floors here are in

moderately good condition. In the old part, however, the floors are badly slivered and quite unsightly, containing large crevices for the collection and dissemination of dust. The floors are swept but twice a week and washed only twice a year, once during the fall and once during the mid-year vacation. More suitable woods for school floors are maple, birch and oak, the last named being the most desirable. The present floors could be greatly improved by applying a wood filler and giving them an oil finish, so that they may be more readily swept and cleaned and be less absorbent.

Walls. The walls of the rooms are papered. The paper is in all cases a large figured pattern in dark colors, except the ceiling, which is somewhat lighter. In the new part of the building the combination of colors is a blue and green and in the old part the combination is a brown and green, neither being at all restful to the eye.

To prevent the spread of contagious diseases among the children, the school rooms should be disinfected at regular intervals, or at least after such times as there has been a prevalence of diphtheria, scarlet fever or other communicable diseases common to children. As a part of this disinfecting process the walls as well as the floors and woodwork should be thoroughly washed, and preferably the wash water should contain a disinfecting solution, such for instance as mercuric chloride. That the walls may be washed without injury, they should be painted with a suitable oil paint. The color of this paint should be some light and pleasing tint that will not greatly absorb light and that will not tend to irritate the eye. The best suited colors are a soft light green or blue.

Blackboards. The arrangement of blackboards is possibly the best that can be made under the circumstances. An improvement could be made, however, in the chalk troughs by arranging screens on hinges over them to hold the chalk. This would allow the dust to fall below into the troughs, where it would cause no inconvenience in handling the chalk and could be removed by the janitor after school hours.

LIGHTING.

The light space of the windows in the old portion of the building is approximately 170 square feet for each room and in the new portion, 150 square feet for each room, or, respectively, 0.20 and 0.18 of the floor space. This would satisfy, though somewhat stintingly, the accepted standards, which require a ratio of light space to floor space of 0.17 to 0.25. The windows, however, are very poorly disposed for giving proper light effects. They are tall and narrow, about 2½ feet wide by 9 feet high, and have great wall spaces between them. The light thus falls in streaks across the rooms, causing shadows and half shadows, which are very severe on the eyes of the pupils. This unsatisfactory condition is further aggravated by having light of almost equal inten-

sity coming from two sides of the room (note Diagram 1). In a school room the best light conditions are obtained when the windows are all placed on one side of the room to the left of the pupils and the wall space between the windows made the least practicable. This arrangement gives a strong dispersed light, and the hands of the pupils when writing will not cast shadows on their work. Where, owing to nearby buildings or other obstruction, sufficient light cannot be obtained from one side, it is permissible to place a few windows back of the pupils, but the light emanating from these should be much feebler than that coming from the left. The objection to windows placed in the rear of the room is that they are severe on the eyes of the teacher. In some of the rooms of the West Mansfield school the strongest light comes from the back and in others from the right, but in no case is the light from the left sufficient to overbalance the light from some other direction. Part of this unsatisfactory condition is caused by the construction of the building, but matters could be greatly improved by arranging the seats and desks as shown on Diagram 2. With this arrangement the strongest light would come from the left in all cases, except in the northeast corner room. In this room at least a very large portion of the light would come from the left.

Shades. Another matter that affects the light conditions of the room is the kind and arrangement of shades. These are dark in color and hang from the tops of the windows. A shade may thus not be drawn to exclude direct sunlight entering near the bottom of the window without shutting out all of the light. Furthermore, many of the shades are in a bad state of repair. A much better arrangement would be to have the shades fixed so as to draw up from the bottom of the windows.

With the present arrangement of windows the dispersion of light could be very much improved by glazing those to the left of the pupils with what is known as factory ribbed glass, the ribs being placed vertically so as to diffuse the light horizontally. This would in very large measure overcome the effects of the great wall spaces between windows. Those windows glazed with factory ribbed glass should be provided with light shades and the windows in the rear of the room should be provided with dark shades. By a proper manipulation of the shades a very suitable quality of light could be obtained, even if somewhat feeble in intensity. Reglazing and providing new shades is a matter of but small expense and should be attended to in the interest of the eyesight of the children.

DESKS AND CHAIRS.

The desks and chairs (or benches, as in this case) are of the old-fashioned type and non-adustable. Modern authorities on school sanitation are very strong in condemnation of this kind of school furniture and recommend most strongly desks and chairs that are adjustable both

with respect to height and relative position. It is urged by these authorities that habitually improper positions of children while seated at their desks are the cause of considerable deformity. The replacement of desks and chairs in the West Mansfield school would be a matter of great expense and may be left to the future as other and more important matters demand immediate attention.

HEATING AND VENTILATING.

The heating and ventilating apparatus of the building is poorly designed, is in a poor state of repair, and is very inefficient in its operation. There are two furnaces placed in the basement, under the new building. These furnaces are each about 4 feet wide, 5 feet high and 12 feet long, and constructed of cast iron plates. In the front of each furnace is a combustion chamber which is partially lined with fire brick. The grate area is 9 square feet. Below the combustion chamber is an ash pit. The flame and heated gases from the fire on the grate pass backward from the combustion chamber through a system of short vertical air flues about 4 inches in diameter and passing through the body of the furnace. From the flue chamber the gases pass into the smoke flue and thence to the chimney. The furnaces are encased in a brick setting or housing which allows an air space above, below and on the sides of each furnace. The air to be heated is introduced into the housing below the furnaces and in rising passes around the furnaces and through the vertical flues, above mentioned, into the space above the furnaces which may be termed the hot air chamber. From here the hot air is drawn off by three hot air ducts. There is one duct for each pair of class-rooms vertically grouped. A short distance beyond the furnace each hot air duct divides, one going to the individual rooms. The branch ducts are about 12 inches square or 1 square foot in cross section. Heat is admitted to the rooms through radiators 2 feet square; about one-third of the area is taken up with grating, thus allowing a net area of approximately $2\frac{2}{3}$ square feet. One such radiator is provided for each room. An outlet for vitiated air is placed in the floor of each room. The heated air forces out the vitiated air through these openings, from whence it is conducted back to the space below the furnaces. Fortunately the location of the outlet gratings in the rooms with respect to hot air inlets, the frequent use of windows to assist ventilation, and the fact that an opening has been made in the brick work under the furnaces admitting air from the basement of the building, all combine to prevent to a great extent the return of reheated vitiated air into the school rooms. But even so, the fact that new air is largely taken from the basement of the building instead of well above the ground level, is to be condemned.

It has been found in practice very difficult to heat those rooms which

have a northerly exposure, especially when northerly winds are prevailing; and on several occasions during very cold weather it has been necessary to dismiss the classes occupying these rooms. The downstairs room in the northeast corner of the old building, under which there is no basement, requires a large stove in addition to the furnace heat to keep it at a proper temperature.

The relative heat entering the several rooms is impossible of regulation owing to the lack of suitable dampers. The furnaces are in bad repair, and the crown arch plates over the combustion chambers are warped and broken so that they contain openings of considerable size, which permit gases from the furnaces to pass to the hot air chamber. In starting the fires, before a strong draft is established toward the smoke flue, great quantities of smoke and gas pass through the openings in the crown plates, thence into the hot air ducts and class-rooms. This feature, while causing very vigorous complaint, cannot be ascribed to the improper construction of the furnaces, but rather to the fact that they are not maintained in repair. As before noted, there is but one radiator in each room, which is placed near one corner in one of the inside walls and slightly above the floor level. In the old portion of the building the inlet grating is placed in the short inside wall and in the new portion in the long inside wall. The outlet grating for the vitiated air is placed in the floor and on the same side of the room as the radiator. In the old part the outlet grating is only a few feet from the radiator, but in the new it is at the opposite end of the room. Such an arrangement, while possibly as good as can be obtained with single points of entrance and exit, does not give anything like an even distribution of the heated air. Furthermore, the radiator being but a few feet above the floor, impigns a strong draft of hot air on the pupils in its vicinity. Experiments by the Connecticut State Board of Health have shown quite conclusively that in an unoccupied room the best results are obtained by introducing the heated air through a series of radiators on the inside wall of the room, ranged along the entire length of the wall and 8 or 9 feet above the floor. The outlet radiators for vitiated air should be placed on the same side of the room, likewise extending the whole length of the wall and should be at or near the floor level. The outlets should be somewhat larger in area than the inlets. With this arrangement the entering heated air passes across the upper portion of the room until it strikes the cold outside wall. The chilling effect of the wall causes it to take a downward course until it gets near the floor. Then it passes back through the lower part of the room and thence into the outlet ducts (see Diagram 3). This process is no doubt interfered with by the heat of the pupils in their seats, but in a room not overcrowded the effect of this would be very slight.

During the past year eighty tons of coal have been consumed in

approximately 120 days; that is, about two-thirds of a ton of coal is used per day of nine hours, which is excessive for a building of this size.

Air Ducts Used With Old Heating System. Another matter which should be considered under "Heating and Ventilating" is the existence of old air ducts in the rooms of the old portion of the building, which were probably intended to conduct vitiated air from the rooms when each room was provided with a separate stove. These ducts are entered by a grating placed in the floor in the angle formed by the outside walls of the rooms. The ducts lead to the space between the floor and the ground. With the installation of the present heating system, these ducts were not removed but were rendered ineffective by simply bricking up the small windows left in the foundation underneath the lower floor for providing circulation of air. In this manner the stagnant ground air from underneath the building is allowed to rise into the rooms. This condition of affairs is very unhealthy, especially to the children on the lower floor. The ducts should be removed as soon as possible and free circulation should be provided below the floor until such time as a basement can be dug.

There can hardly be a question of doubt but what the school should be provided with a new heating and ventilating system, and that at a very early date, for at present the children are compelled to sit in vitiated air or strong drafts of either cold or hot air. The new system should preferably be what is known as the modified indirect system. The essential features included in such a system should be as follows:

(1) At least 1,800 cubic feet of fresh air per hour should be furnished to each pupil.

(2) The air should be taken from the outside of the building well above the level of the ground.

(3) In the fresh air duct near its entrance into the building should be placed a fan of either the propeller or centrifugal type. This fan should be driven either by an electric motor or small steam engine; steam in the latter case to be furnished from the boilers of the heating plant.

(4) The fresh air duct should be provided with suitable dampers for controlling the amount of air admitted to the building.

(5) The fresh air duct should be enlarged into a chamber in which steam coils should be placed. The coils should have sufficient area to heat the incoming air in the coldest weather to a temperature of 120 degrees Fahrenheit. The coils should be arranged in three or more sections controlled by valves so that steam may be admitted to any or all. In this way in mild weather the temperature may be suitably regulated.

(6) From the heating chamber ducts should convey heated air to the various rooms and each duct should be provided with a suitable damper for regulating the amount of air passing through it. These damp-

ers should be so placed that they may be operated by the janitors in the basement.

(7) The heated air should be admitted to the several rooms through at last three radiators equi-distantly spaced and placed along the entire inside wall, 8 or 9 feet above the floor.

(8) The vitiated air should be drawn off from the rooms through grated openings having an aggregate area somewhat greater than the aggregate area of the radiators. The vitiated air openings should be placed in or near the floor on the same side of the room as the radiators.

(9) The outlet ducts sould convey the vitiated air to a vertical duct or ducts leading to the roof. A current of air should be induced in the vertical duct or ducts by placing therein several steam coils.

(10) All outlet openings for vitiated air should be provided with an opening and closing device to be operated from the school room.

(11) All rooms on the north side of the building should be provided with steam radiators placed under the windows, to be used in cold weather when the heated air from the radiators is insufficient to bring the room to the proper temperature.

(12) If the fan in the fresh air inlet is operated by an electric motor, thus being independent of the heating furnaces, the ventilating system may be used in warm weather without fear of creating drafts such as would occur by ventilating through the windows.

PRIVIES.

The privies are poorly constructed, are over 100 feet from the building, are not screened from sight, and that for boys at least is in an indescribably bad condition. Owing to the fact that it is generally agreed that improperly kept privies are liable to spread disease, more particularly typhoid fever, immediate attention should be given to the proper reconstruction of the privies belonging to this school building.

Without a public sewerage system or public water supply the school authorities are unable to dispose of fecal matter by water carriage except at exceedingly great expense. Some form of dry closet seems to be necessary. A system such as the Smead or Warren might be installed within the building, but these systems usually involve the use of the vitiated air from the heating and ventilating system of the building for drying the excreta. The connection of closets with the heating and ventilating system should not be permitted under any circumstances on account of the danger of back drafts. If either of these systems was to be used it would be necessary to have a separate apparatus for supplying the heated air necessary, and this would probably render the installation of such a system prohibitive on account of the expense. In addition to this, the village will no doubt have a public water supply and sewerage system in the not distant future when a suitable water carriage

system may be installed, and it would then become necessary to remove the elaborate Smead or Warren system.

Without doubt the only feasible method to be pursued at the present time would be to reconstruct the present outdoor privies. In so doing the following essential features should be borne in mind:

(1) Privies should be placed as near the school building as practicable without occasioning odors within the building. A safe distance would be 100 feet.

(2) As a protection against the weather there should be covered, or partially covered, approaches from the school building to the privies and in the interests of morality the approaches for boys and girls should be screened from each other.

(3) The privies should be housed in substantially constructed wooden buildings, roomy, well ventilated and well lighted. In winter time they should be moderately heated.

(4) One seat should be provided for every twenty pupils and a urinal should be placed in the boys' privy. The urinal should be of porcelain and so constructed as to be readily cleaned.

(5) Water-tight receptacles for fecal matter should be provided and placed at or above the surface of the ground and in such a way as to be readily accessible for cleaning and inspection. (Oil barrels cut in two make good receptacles.)

(6) The receptacles should be enclosed by a suitable housing that will not interfere with their ready inspection and removal but which will screen them from general view and prevent the entrance of flies.

(7) All seats should be provided with hinged covers that will not remain open unless held open.

(8) At least once a day the janitor should thoroughly sprinkle the receptacles with fine dry loamy earth. (Sand, clay and ashes are much less suitable for the purpose.)

(9) Receptacles should never be allowed to fill to overflowing. On becoming reasonably full the receptacles should be removed, emptied and cleaned. On being replaced they should be generously sprinkled with hydrate of lime.

(10) Interior and exterior of privies should be kept scrupulously clean and in good repair.

It being impossible to provide closets of the most approved type is no excuse for their unsanitary condition, but on the contrary simply emphasizes the necessity for a greater effort in their proper maintenance; hence, in the present instance the privies when reconstructed along the lines indicated, should receive the most constant and careful attention.

Of the various unsanitary conditions noted, the condition of the privies is undoubtedly the most menacing and immediate attention should be directed toward their reconstruction.

SUMMARY.

(1) In order that the children may play about the school yard without danger of wetting their feet, the ground should be properly underdrained, and if feasible, should be surfaced with a few inches of mixed sand and gravel.

(2) In order that the floors of all the rooms may be kept dry and warm, the basement should be extended under the entire building.

(3) The floors should be treated with a filler and given an oil finish in order that they may be better and more easily kept clean.

(4) The walls of the school room should be painted with an oil paint that will stand washing. The painted walls should be of a light tint that will not irritate the eyes, such as light blue or green.

(5) The light conditions in the school rooms should be improved by rearranging the desks and chairs as outlined, providing the windows to the left of the pupils with factory ribbed glass and light shades, providing the windows to the back of the pupils with dark shades, and arranging the shades so that they may be drawn up from the bottom of the windows.

(6) When desks and chairs require renewing, an adjustable type should be procured.

(7) The heating and ventilating system is improperly designed, in a poor state of repair, and very inefficient. It should be torn out and a new system of modified indirect steam heating should be installed. This system should embody as its main features the points outlined under "Heating and Ventilating."

(8) New privies should be built and should embody as their main features the points outlined under "Privies."

The improvements that require immediate attention are: (1) Reconstruction of privies; (2) Renewal of heating and ventilating system; (3) Improvement in the lighting of rooms; (4) Painting of walls so that they may be washed; (5) Treatment of floors so that they may be less absorbent and more easily kept clean; and (6) Underdraining of the school house grounds and if possible surfacing with a mixture of sand and gravel.

The other improvements, namely, the construction of a basement under the entire building and the replacement of present desks and chairs with new ones of an adjustable type, are matters that require attention but may be left to the more distant future if funds are not now procurable.

Another matter which cannot be too strongly emphasized is the proper maintenance of the school building. All floors should be swept daily and washed weekly, and the desks and chairs should also be washed with soap and water not less than twice a month. It would be highly desirable to disinfect the rooms during every vacation and without fail

after there have been cases of communicable children's diseases. Owing to the danger of the improper maintenance of the privies, they should receive most constant and careful attention.

Before letting any contracts on the work herein recommended, it would be desirable for the school authorities to submit plans for same to the State Board of Health for review and suggestions.

A copy of this report was furnished the health officer of West Mansfield on May 17, 1907.

WEST MANSFIELD.

SANITARY SCHOOL INSPECTION.

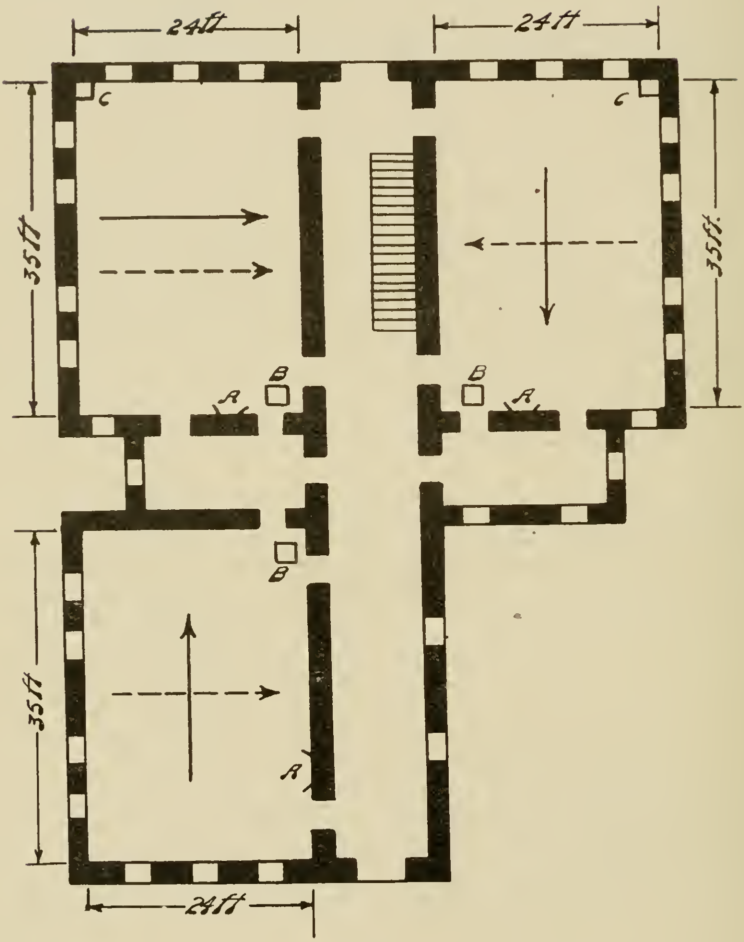

DIAGRAM 1.

Floor Plan of Building, showing location of Doors, Windows, Ventilating Apparatus, and Arrangement of Seats.

NOTE: — Large arrows show direction in which seats of pupils face. For lower floor, arrows are shown solid, and for upper floor, dotted. Points (A) show location of radiators. Points (B) show location of outlets for vitiated air. Points (C) show location of inlets to old flues.

WEST MANSFIELD.

Sanitary School Inspection.

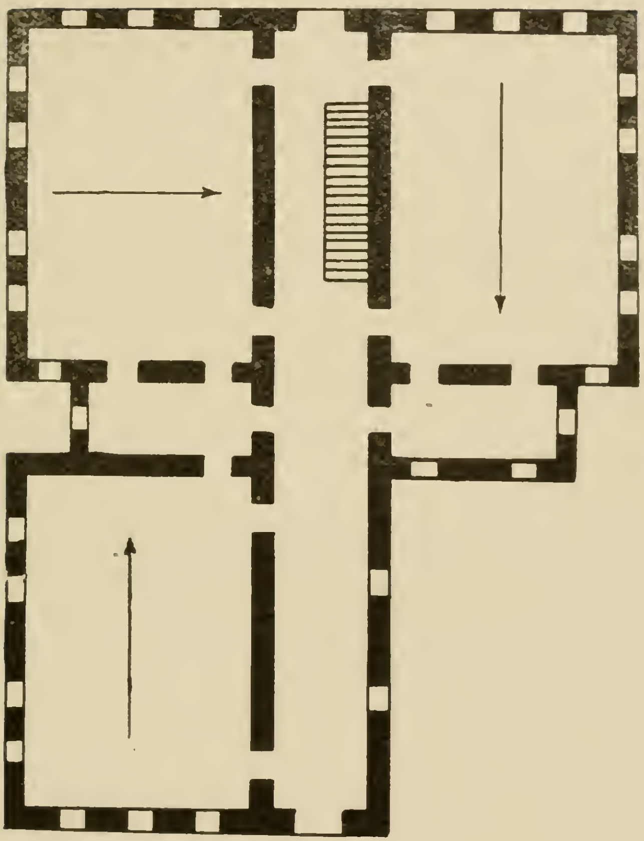

Diagram 2.

Floor Plan of Building, showing Best Arrangement of Seats.

Note: — Large arrows show direction in which seats of pupils should face.

WEST MANSFIELD.

SANITARY SCHOOL INSPECTION.

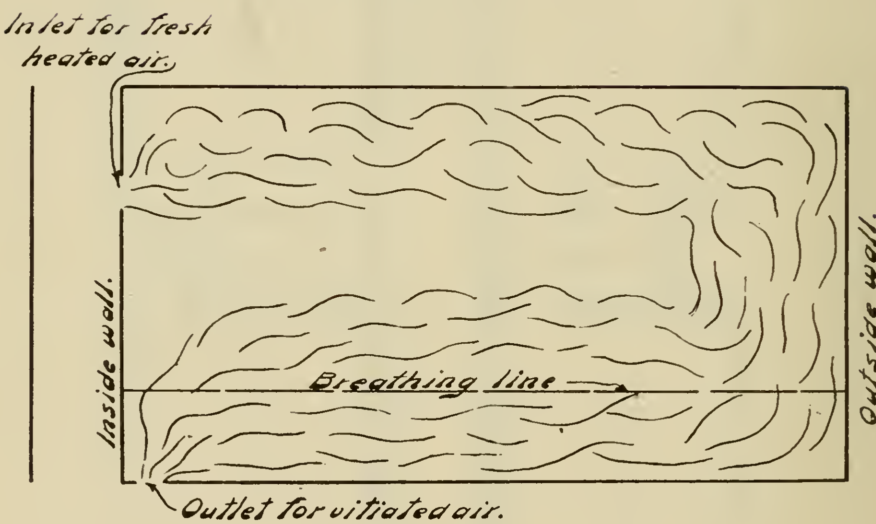

DIAGRAM 3.

Section Through School Room, showing Method of Securing Best Distribution of Air.

REPORT ON AN INVESTIGATION OF SWAMP DRAINAGE NEAR THE HEAD WATERS OF THE STILLWATER RIVER.

On June 20, 1907, there was received from Mr. Will Duncan of Ansonia, Darke County, the following petition signed by thirty-nine interested persons:

"*To the Honorable State Board of Health of the State of Ohio*:

We, the undersigned, resident citizens living in or near the swamps of Still water, which rises in or near Jackson Township and flows through Brown and Richland townships, all of Darke County, Ohio, desire to call your attention to the unsanitary condition of said creek and swamps; there are hundreds of acres of land that become flooded two or three times each year, leaving water standing for weeks, which becomes stagnant and filthy, causing malaria and general sickness. Two years ago this August vegetation was killed by standing water.

"Four or five years ago there was a petition for an outlet granted, apportioned and then rejected on day of last hearing by the board of commissioners of Darke County, Ohio. The report of the engineer on said petition, shows that the stream has twenty-five feet and one inch fall, in a little less than twelve miles.

"We earnestly pray for your early attention and investigation."

In response to this petition the assistant engineer visited the locality in question on July 9, 1907, and made an investigation in which he was assisted by a number of the petitioners. The following report was submitted:

The Stillwater River rises in the northwestern part of Darke County and flows in a general easterly direction through Brown and Jackson townships. It also has one tributary from Mississinawa Township. Through the greater part of its course to a point somewhat below the village of Ansonia, the main stream flows through marsh-land. It is estimated that at Ansonia the watershed of the river is approximately thirty-five square miles or 22,400 acres. A number of farms, aggregating a total area of approximately 3,000 acres, are more or less affected by the inadequate drainage of the stream. Of the 3,000 acres, about 900 are subject to destructive floods, while approximately 300 are rendered practically useless by a marshy condition that continues during nearly the whole summer season.

The matter of creating freer drainage was taken up about thirty years ago and the channel of the river was widened and deepened but not strengthened. It is stated that the improvement never produced satisfactory results and that in a few years the channel became so clogged that it was of very little practical value. About ten years ago the improvement of the channel of the Stillwater River was again revived and the channel previously excavated was cleaned out. This resulted in somewhat improved conditions for a time but still the drainage was not considered satisfactory.

According to the petition submitted to the State Board of Health, a number of the affected farmers petitioned the county commissioners for a suitable ditch some five or six years ago. After surveys had been made by the county engineer and assessments appropriated, the county commissioners refused to grant the petition after lengthy consideration, it being maintained that the benefit derived would not be commensurate with the expenditure involved. The estimated cost of the proper construction of the ditch, according to the county engineer, was $104,000.

Recently the problem has again been taken up, owing to serious damage to crops and a desire to place more land under cultivation. It is also believed that the great number of mosquitoes bred in the swampland causes malarial fever in the neighborhood and that the bad odors resulting from the decomposition of organic matter in the swamps create a serious nuisance and militate against the healthfulness of the locality. At the time of investigation it was found that large tracts of land were not being cultivated. These were covered with a dense growth of weeds, with here and there stagnant pools of water in which great numbers of mosquito larvae could be seen. Likewise the area covered by the swamps was so infected with mosquitoes that it was very difficult to remain there for any length of time. Odors arising from the decomposition of organic matter in the swamp district were not especially noticeable at the time of investigation, but it is quite probable that after prolonged dry weather such odors may become very offensive. The length of time that water stands on the land after a rise in the river was variously stated from three weeks to all summer. Apparently the flood waters are unable to drain off rapidly through the river channel and remain standing for several weeks over the fields. This is frequently sufficient to kill a crop. Some pools of stagnant water remain well into the summer and others last possibly throughout the entire year. It is probable that in many instances the pools of stagnant water could be drained by means of properly laid drain tile; yet such drainage could hardly be expected to render the land suitable for farming purposes.

It is obvious from the investigation that the conditions existing constitute a nuisance and to a certain extent create unhealthful conditions, and that improvement of drainage throughout the locality is highly desirable. The bad effects of improper drainage have not, however, been so serious to date but that the economic side of the problem must be taken into consideration before improvements may be instituted. Such consideration includes such items as the economical size of channel, the manner of assessment on benefited property owners, the proportion which the county may be reasonably expected to pay, damages, etc.

The petitioners were apparently not convinced that the estimates prepared by the county engineer some four or five years ago and the proposed manner of apportioning the cost of the work were properly made. There is no doubt but that the problem is highly complicated and

admits of many differences of opinion as to the manner in which the work should be done. In order that the petitioners may gain a more thorough knowledge of the nature of the problem, it would be highly desirable for them to expend a sum of money for the purpose of having an investigation made by a disinterested consulting engineer, who should be required to render a full report on the subject to the petitioners. Such a report should include a description of methods of construction, detailed estimates of first cost and cost of maintenance, benefits to be expected, and plans and specifications. A lawyer should also be retained to assist the engineer in preparing an apportionment of cost and to advise the petitioners as to the best method of proceeding to secure action on the part of the county commissioners. With such complete information the petitioners would be enabled to consider more intelligently whether or not the improvements desired are practical at the present time; and in event the scheme appears to be feasible, they would be in a position to prosecute the matter more effectively.

A copy of this report was furnished the petitioners July 23, 1907, with a letter stating that the proposed drainage would undoubtedly improve public health conditions, and the hope expressed that some satisfactory agreement might be reached by which the work could proceed.

REPORT ON DISPOSAL OF WASTES FROM A TANNERY AT CONNEAUT.

At the request of the health officer of Conneaut, the chief engineer visited that city on August 7, 1907, and investigated the matter of disposing of the wastes from the tannery of Messrs. Whitney and Comstock. The following report was submitted.

The tannery of Whitney and Comstock is situated in the northwesterly part of the city of Conneaut, adjacent to the built-up portion. At this tannery salted hides are received and are treated by soaking in lime tanks and also in tanks containing tan bark. The amount of water used is approximately 10,000 gallons per day.

The drainage from the lime tanks, which consist of precipitated lime together with hair and organic matter from the hides, is periodically flushed out on to a piece of low ground near the tannery and also adjacent to the right of way and round house of the Nickel Plate Railroad. This low ground is adjacent to a swamp or "swale" which extends in a northerly direction, about a thousand feet, to the L. S. & M. S. Railroad tracks. The drainage from this swamp is carried away by a ditch running in an easterly direction parallel with and immediately south of the L. S. & M. S. tracks.

Complaint is made of the odors arising from the portion of the

swamp where the tannery wastes are deposited. The final effluent from the swamp is apparently not polluted.

CONCLUSIONS.

In order to prevent nuisance caused by the disposal of tannery wastes on to the low ground near the tannery of Whitney and Comstock, a covered tank should be built to receive these wastes and allow the solid matters to settle out. The tank should have a capacity of 15,000 to 20,000 gallons and should be so designed as to allow the greatest sedimentation. It should be cleaned when necessary. The effluent from such a tank would probably not be offensive. If, however, it should prove to be offensive, it could, without changing the tank, be further purified.

A copy of this report was sent to the owners of the tannery, and to the health officer of Conneaut, August 21, 1907.

EXAMINATIONS MADE IN THE LABORATORY.

WORK OF THE LABORATORY.

This part of the report deals with the various examinations made in the laboratory during the year ending December 31, 1907. The work has been done by Mr. L. V. Parker, bacteriologist and chemist in charge of the laboratory, assisted by Mr. C. B. Young, Mr. C. F. Long and Mr. Fred Berry. The number of samples examined during the year was 3,284.

In addition to the routine work the laboratory engaged in the following special investigations:

a. The efficiency of filtration in public water supplies in Ohio.

b. A study of the various sewage disposal plants of the state.

c. A study of the effect of copper sulphate and calcium hypochlorate on colon bacilli in sewage in co-operation with the U. S. Department of Agriculture.

d. A study of the efficiency of a water softening plant at Oberlin.

The expenses of the laboratory during the year were:

Salaries	$4,120 33
Apparatus, Supplies, Incidentals and Traveling Expenses	763 57
Total	$4,883 90

EXAMINATIONS OF DIPHTHERIA SPECIMENS.

Place.	No. of Samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Alliance	4	2		2			
Amherst	1			1			
Amlin	1				1		
Amsterdam	4	2	1		1		
Ansonia	2			1	1		
Apple Creek	4		1	1	2		
Ashland-Orange	1		1				
Athens	10	2	5	2	1		
Auglaize-Union	1		1				
Batavia	7	1	1	1	4		
Beaverdam	1		1				
Bergholz	3		2		1		
Bluffton	1	1					

EXAMINATIONS OF DIPHTHERIA SPECIMENS — Continued.

Place.	No. of Samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Bourneville	1			1			
Broadwell	2	2					
Brookville	1			1			
Cadiz	3			2	1		
Caldwell	2		2				
Canal Dover	1						1
Carrington	1			1			
Chillicothe	1			1			
Clermont–Jackson	1				1		
Clermont–Miami	1			1			
Columbus	2	2					
Conneaut	1	1					
Decatur	1				1		
Defiance	3		1	2			
Delaware	123	11	23	35	54		
Dunkinville	1			1			
East Liverpool	3			2		1	
East Palestine	1			1			
Eaton	1			1			
Elyria	14	1	5	4	4		
Findlay	1						1
Fostoria	1		1				
Franklin–Hamilton	1	1					
Franklin–Jefferson	1	1					
Fremont	2		1		1		
Gallia	1	1					
Gallia–Springfield	4	2		1	1		
Galion	1	1					
Geneva	1				1		
Glenmont	1			1			
Greenville	12	1	1	6	3	1	
Grove City	4	1	2		1		
Hamilton	2				2		
Haydenville	1	1					
Hemlock	1			1			
Hilliards	1			1			
Hillsboro	1	1					
Holgate	5	1	2	2			
Jackson–Washington	1			1			
Jefferson–Ross	1			1			
Jefferson–Wolf Run	1			1			
Jewell	4	2					2
Johnstown	5	2				1	2
Junction City	1			1			
Kinsman	2	1			1		
Knox–Jefferson	1	1					
Lakeview	2		1	1			
Lebanon	2			1	1		
Lima	5	3	1	1			
Logan	8	3	3	1	1		
London	2	1			1		
Loramie	1						1

EXAMINATIONS OF DIPHTHERIA SPECIMENS — Continued.

Place.	No. of Samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Loveland	2	1	1	......	......	......	......
Madison	1	......	......	1	......	......	......
Madison-Fairfield	1	......	......	1	......	......	......
Magnolia	4	1	1	1	1	......	......
Mansfield	5	1	1	1	2	......	......
Marion	2	......	1	......	1	......	......
Martins Ferry	1	......	1	......	......	......	......
Massillon	4	......	1	2	......	......	1
Mechanicstown	1	1	......	......	......	......	......
Medina	2	1	......	......	1	......	......
Medway	1	......	1	......	......	......	......
Mentor	1	1	......	......	......	......	......
Middleport	1	......	......	......	1	......	......
Milford	3	1	1	......	1	......	......
Millfield	1	......	......	......	1	......	......
Moxahala	1	1	......	......	......	......	......
McArthur	3	1	......	......	2	......	......
Mt. Gilead	3	......	2	......	1	......	......
Mt. Vernon	2	1	......	......	1	......	......
Napoleon	5	2	2	......	1	......	......
New Carlisle	1	......	......	......	......	1	......
New Lexington	32	5	8	8	11	......	......
New Straitsville	1	......	1	......	......	......	......
Perry-Monroe	1	......	......	......	1	......	......
Pierce	1	......	......	......	1	......	......
Piqua	20	7	5	2	5	1	......
Portsmouth	1	......	......	1	......	......	......
Put-in-Bay	1	......	......	......	......	......	1
Ripley	4	......	2	1	......	1	......
Rockwood	1	1	......	......	......	......	......
Salem	1	......	......	1	......	......	......
Sandusky	9	1	1	4	3	......	......
Santa Fe	3	......	......	......	2	......	1
Savannah	1	......	1	......	......	......	......
Scioto-Valley	1	1	......	......	......	......	......
Seneca-Hopewell	1	......	......	......	1	......	......
Sidney	12	5	1	2	3	......	1
South Charleston	5	......	1	2	......	1	1
Stark-Washington	1	......	......	1	......	......	......
Stewart	1	......	......	......	1	......	......
Sunbury	3	1	2	......	......	......	......
St. Marys	2	1	......	1	......	......	......
Tiffin	2	......	......	......	2	......	......
Uniopolis	4	2	1	1	......	......	......
Van Wert	1	1	......	......	......	......	......
Vendocia	2	1	......	1	......	......	......
Venice	1	......	1	......	......	......	......
Wapakoneta	1	......	1	......	......	......	......
Washington C. H.	4	......	2	1	......	1	......
Waterford	2	1	......	......	......	1	......
Waynesburg	4	1	......	1	2	......	......
Wellston	2	1	......	1	......	......	......

EXAMINATIONS OF DIPHTHERIA SPECIMENS — Concluded.

Place.	No. of Samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
West Union	5	1	1	1	2	......	......
Xenia	1	......	1	......	......	......	......
Zanesville	18	4	3	5	6	......	......
Total	475	95	100	121	138	9	12

EXAMINATIONS OF SPECIMENS OF SPUTUM FOR TUBERCLE BACILLI.

Place.	No. of Samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Adams–Winchester	1	......	1	......	......	......	......
Akron	64	14	21	13	15	1	......
Albany	4	......	1	1	2	......	......
Allen–Shawnee	2	......	1	1	......	......	......
Allen–Sugar Creek	1	......	......	......	1	......	......
Alliance	1	......	1	......	......	......	......
Alpha	1	......	......	1	......	......	......
Amherst	1	......	1	......	......	......	......
Andover	2	......	......	......	1	......	1
Apple Creek	1	......	......	......	1	......	......
Ansonia	1	1	......	......	......	......	......
Ashland	9	......	4	......	5	......	......
Ashtabula	3	1	......	......	2	......	......
Ashville	2	1	1	......	......	......	......
Athens	23	......	11	2	10	......	......
Ashtabula–Austinburg	1	......	......	......	1	......	......
Ashtabula–Rome	2	1	1	......	......	......	......
Athens–Rome	2	......	1	......	1	......	......
Athens–Ross	1	......	......	1	......	......	......
Athens–York	1	......	1	......	......	......	......
Atlanta	1	......	1	......	......	......	......
Austinburg	1	......	......	......	1	......	......
Bainbridge	2	1	......	......	1	......	......
Barberton	4	......	2	......	1	......	1
Barnesville	1	......	......	......	1	......	......
Batavia	5	1	1	......	3	......	......
Brazil	1	......	......	......	1	......	......

EXAMINATIONS OF SPECIMENS OF SPUTUM FOR TUBERCLE BACILLI — Continued.

Place.	No. of Samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Beach City	1				1		
Beallsville	2			1	1		
Bellaire	3				3		
Bellefontaine	1			1			
Bellevue	9		2	2	5		
Belmont-Goshen	1				1		
Belpre	2			1	1		
Big Springs	1	1					
Bloomdale	1		1				
Bloomville	3	1		1	1		
Bluffton	1				1		
Bourneville	1				1		
Bradford	1	1					
Bridgeport	2			1	1		
Bryan	2		1	1			
Buckland	3	1	2				
Bucyrus	24	6	6	4	8		
Butler-Fairfield	1		1				
Butler-Wayne	1			1			
Cadiz	4		2	1			1
Cambridge	3			1	1		1
Camden	1		1				
Canal Dover	7	2	2	1	2		
Canal Winchester	11	1	3	3	3		1
Canfield	1				1		
Canton	7		3	1	3		
Cardington	2	1	1				
Carroll	3		1	1			1
Carroll-Brown	1			1			
Catawba Island	2				2		
Cedarville	2		1	1			
Celina	1		1				
Centerburg	1		1				
Chardon	1				1		
Chatfield	4		2		2		
Chillicothe	5		1	1	3		
Circleville	2				1		1
Claiborne	1				1		
Clermont-Tate	1		1				
Clermont-Simmes	1		1				
Cleveland	1		1				
Coal Grove	1		1				
College Corner	1	1					
Collinsville	2		1				1
Columbiana	1				1		
Columbus	21	3	6	5	7		
Columbus Grove	4			1	3		
Conneaut	8	1	1	2	4		
Conway	1				1		
Copley	1			1			

EXAMINATIONS OF SPECIMENS OF SPUTUM FOR TUBERCLE BACILLI — Continued.

Place.	No. of Samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Crawford–Liberty	1	......	......	1	......	......	......
Crawford–Whetstone	1	......	1	......	......	......	......
Crestline	2	1	1	......	......	......	......
Creston	1	......	......	......	1	......	......
Cridersville	1	1	......	......	......	......	......
Crooksville	5	1	1	......	3	......	......
Curtice	7	2	2	1	2	......	......
Cuyahoga–Dover	1	......	......	......	1	......	......
Cuyahoga Falls	3	......	2	......	1	......	......
Darke–Adams	1	......	......	1	......	......	......
Dayton	3	......	......	......	2	......	1
Defiance	6	......	2	1	3	......	......
De Graff	1	......	......	......	1	......	......
Delaware	32	......	10	6	16	......	......
Delphos	1	......	......	1	......	......	......
Dennison	5	2	......	1	2	......	......
Dresden	1	......	......	1	......	......	......
East Liverpool	12	3	3	1	5	......	......
East Palestine	8	2	2	2	2	......	......
East Toledo	3	1	......	1	1	......	......
Eaton	3	3	......	......	......	......	......
Elyria	7	......	4	2	1	......	......
Fairfield–Bloom	1	......	1	......	......	......	......
Fairfield–Liberty	1	......	......	......	1	......	......
Fairport Harbor	3	......	......	......	3	......	......
Farmersville	3	......	1	1	1	......	......
Findlay	13	2	2	3	6	......	......
Flushing	1	......	......	......	1	......	......
Fostoria	17	4	5	2	5	1	......
Franklin	1	......	1	......	......	......	......
Franklin–Clinton	2	......	......	1	1	......	......
Franklin–Jackson	1	......	1	......	......	......	......
Franklin–Truro	1	......	......	1	......	......	......
Fredericksburg	1	......	......	......	1	......	......
Fremont	8	1	3	2	2	......	......
Gahanna	1	......	......	......	1	......	......
Galion	14	1	7	3	3	......	......
Gallipolis	1	......	......	......	1	......	......
Geneva	1	......	......	......	......	......	1
Georgetown	1	......	......	1	......	......	......
Germantown	1	......	......	1	......	......	......
Gibsonburg	1	......	......	......	1	......	......
Glenmont	3	......	3	......	......	......	......
Glouster	3	......	......	3	......	......	......
Grafton	1	......	......	......	1	......	......
Granville	3	......	3	......	......	......	......
Greenfield	4	......	1	1	2	......	......
Greenford	2	......	1	......	1	......	......
Greenspring	2	......	......	1	1	......	......
Greenville	4	1	1	......	2	......	......

EXAMINATIONS OF SPECIMENS OF SPUTUM FOR TUBERCLE BACILLI — Continued.

Place.	No. of Samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Greenwich	3	2			1		
Grove City	6	1	2		3		
Groveport	2		1		1		
Grover Hill	3			2	1		
Hamden Junction	2	1			1		
Hamilton	1				1		
Hanging Rock	5		3		2		
Harrison-German	2		1	1			
Hayesville	1			1			
Higginsport	1		1				
Highland-New Market	2		2				
Hilliards	1		1				
Hillsboro	4		1	2	1		
Holgate	1		1				
Homer	1						1
Hubbard	2		1		1		
Huntsville	1		1				
Iberia	2		2				
Ironton	26	10	8	1	7		
Jefferson	1			1			
Jersey	2		1		1		
Jewett	1			1			
Junction City	3				3		
Kalida	1			1			
Kent	1	1					
Kingston	1				1		
Knox-Brink Haven	1	1					
Knox-Milford	1		1				
LaGrange	2		2				
Lake-Kirkland	1				1		
Lake-Perry	3	1			2		
Lakewood	4		1	1	2		
Lancaster	2		1		1		
Latrobe	1	1					
Latty	2			1	1		
Lawrence-Aid	2			2			
Lawrence-Mason	2				2		
Lawrence-Perry	5	1	4				
Lawrence-Union	4		1	2	1		
Lebanon	1			1			
Lewis Center	1				1		
Lewiston	1		1				
Lexington	1	1					
Liberty	3				3		
Licking-Jersey	3				3		
Lima	14	3	4	1	6		
Lisbon	6		6				
Lithopolis	1		1				
Lodi	2				2		
Logan	2				2		

EXAMINATIONS OF SPECIMENS OF SPUTUM FOR TUBERCLE BACILLI — Continued.

Place.	No. of Samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Logan-Richland	1				1		
London	4	1			3		
Lorain	1		1				
Lorain-Huntington	1				1		
Louisville	1				1		
Loveland	3		2	1			
Lucas	2		1		1		
Magnetic Springs	1				1		
Magnolia	5		1	2	2		
Malinta	1				1		
Malta	3		3				
Malvern	1	1					
Mansfield	13	2	4	3	4		
Mantua	2			1	1		
Marietta	1			1			
Marion	22	4	6	3	9		
Marion-Montgomery	1		1				
Martel	2				2		
Martins Ferry	1					1	
Marysville	13	3	1	1	8		
Mason	1					1	
Medina	3				3		
Meigs-Rutland	1	1					
Meigs-Salisbury	1				1		
Melvin	1	1					
Mentor	4		2		2		
Mercer-Black Creek	1				1		
Middleport	3			2	1		
Milford	1		1				
Miller City	1	1					
Millersburg	2		1				1
Monroe	4			1	3		
Montgomery-Jackson	1				1		
Morgan-Bristol	1				1		
Morgan-Malta	1			1			
Morrow-Congress	1			1			
Moxahala	8		3	1	4		
Murray City	2			1	1		
Muskingum-Blue Rock	1		1				
Muskingum-Highland	1				1		
Muskingum-Jackson	1	1					
Muskingum-Union	1		1				
McConnellsville	5		2	1	2		
McCutchinsville	1		1				
Mt. Gilead	4		3		1		
Mt. Sterling	1						1
Mt. Vernon	9		3	2	4		
Napoleon	5	1			4		
Nelsonville	1		1				
Newark	29	6	8	6	8		1

EXAMINATIONS OF SPECIMENS OF SPUTUM FOR TUBERCLE BACILLI — Continued.

Place.	No. of Samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Neg.	Pos.	Pos.	Neg.
New Athens	1	......	......	......	1	......	......
New Berlin	3	......	......	1	2	......	......
New Comerstown	2	......	2	......	......	......	......
New Concord	2	......	......	......	2	......	......
New Holland	3	1	......	......	2	......	......
New Lexington	16	1	6	3	6	......	......
New Martinsburg	1	......	1	......	......	......	......
New Matamoras	3	3	......	......	......	......	......
New Paris	1	......	1	......	......	......	......
New Philadelphia	5	2	1	......	2	......	......
New Riegel	1	1	......	......	......	......	......
New Vienna	1	......	......	......	1	......	......
New Washington	3	......	......	1	2	......	......
New Waterford	1	......	......	......	1	......	......
Niles	5	......	2	1	2	......	......
Noble-Olive	1	......	......	......	1	......	......
North Ridgeville	1	......	......	......	1	......	......
Norwalk	1	......	1	......	......	......	......
Norwood	1	......	......	1	......	......	......
Oak Harbor	10	3	1	......	6	......	......
Oberlin	6	......	1	1	4	......	......
Ontario	1	1	......	......	......	......	......
Osnaburg	1	......	1	......	......	......	......
Ottawa	3	1	......	1	1	......	......
Ottawa-Clay	1	......	......	......	1	......	......
Ottawa-Danbury	1	......	......	......	1	......	......
Painesville	12	2	4	2	4	......	......
Palmyra	1	......	......	......	......	......	1
Paulding	6	......	......	3	3	......	......
Paulding-Latty	1	1	......	......	......	......	......
Payne	1	......	......	......	1	......	......
Peebles	1	......	......	......	1	......	......
Perry	1	......	......	......	1	......	......
Pickerington	1	......	1	......	......	......	......
Piketon	1	......	1	......	......	......	......
Pike-Preble	1	......	......	......	1	......	......
Pioneer	1	......	......	1	......	......	......
Piqua	11	......	5	3	3	......	......
Pomeroy	1	1	......	......	......	......	......
Portsmouth	22	6	10	3	3	......	......
Preble-Harrison	1	1	......	......	......	......	......
Preble-Jackson	1	......	......	......	1	......	......
Quaker City	1	......	......	1	......	......	......
Ravenna	3	......	......	......	3	......	......
Richmond	1	1	......	......	......	......	......
Richwood	2	......	2	......	......	......	......
Rockwood	2	......	2	......	......	......	......
Roseville	3	......	3	......	......	......	......
Rossburg	1	......	1	......	......	......	......
Ross-Huntington	1	1	......	......	......	......	......

EXAMINATIONS OF SPECIMENS OF SPUTUM FOR TUBERCLE BACILLI — Continued.

Place.	No. of Samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Ross–Jefferson	1				1		
Ross–Paxton	1		1				
Ross–Twin	1				1		
Rushsylvania	1			1			
Rushville	2			2			
Russellville	4		1	1	2		
Salem	10	2	4	2	2		
Salineville	2			1	1		
Sandusky	10	2	5	2	1		
Sardinia	1				1		
Savannah	4	1		1	2		
Seaman	1	1					
Seneca–Pleasant	1		1				
Senecaville	1			1			
Shade	1						1
Shauck	1	1					
Shawnee	1		1				
Shelby	2				2		
Shelby–Salem	2		1		1		
Sidney	6	1	3	2			
Smithfield	2	1	1				
South Lebanon	1				1		
South McKinley	1				1		
South Solon	2	1	1				
South Zanesville	1		1				
Spencerville	2		1		1		
Spring Valley	2	1	1				
Steubenville	12	4	4	2	2		
Storms	1				1		
Stryker	2		1		1		
Sugar Grove	1				1		
Summit–Copley	1				1		
Summit–Coventry	1				1		
Sunbury	4		1		3		
St. Clairsville	2		1				1
St. Louisville	1				1		
St. Marys	1		1				
Tappon	1		1				
Tiffin	19	3	5	2	9		
Tippecanoe	2				2		
Tiro	4	2			2		
Toledo	3		1	1			1
Tontogany	2		2				
Trotwood	2				2		
Troy	1		1				
Tuscarawas–Auburn	1	1					
Tuscarawas–Mill	1				1		
Tuscarawas–Warwick	1			1			
Uhrichsville	9		4	1	4		
Union-Claiborne	1			1			

EXAMINATIONS OF SPECIMENS OF SPUTUM FOR TUBERCLE BACILLI — Concluded.

Place.	No. of Samples.	Result. Male. Pos.	Male. Neg.	Female. Pos.	Female. Neg.	Sex not stated. Pos.	Sex not stated. Neg.
Unionport	1	......	1	......	......	......	......
Uniontown	1	......	1	......	......	......	......
Utica	1	1	......	......	......	......	......
Van Wert	3	1	1	......	1	......	......
Versailles	1	......	1	......	......	......	......
Vinton-Jackson	2	......	......	1	1	......	......
Waldo	2	......	1	1	......	......	......
Warner	1	......	1	......	......	......	......
Warren	1	......	......	......	1	......	......
Warren-Deerfield	1	1	......	......	......	......	......
Warsaw	1	1	......	......	......	......	......
Washington C. H.	1	......	......	......	1	......	......
Waverly	3	1	1	1	......	......	......
Wellington	4	......	......	1	3	......	......
Wellston	2	1	......	1	......	......	......
Wellsville	4	......	......	......	1	1	2
West Alexandria	1	1	......	......	......	......	......
West Cairo	1	......	......	......	1	......	......
West Elkton	1	......	......	......	1	......	......
West Union	2	1	......	1	......	......	......
Winchester	2	1	......	1	......	......	......
Wood	1	......	1	......	......	......	......
Wooster	1	......	......	......	1	......	......
Xenia	1	......	......	......	1	......	......
Youngstown	1	......	......	......	1	......	......
Zanesville	44	4	12	8	20	......	......
Total	1189	169	357	194	444	5	20

EXAMINATIONS OF TYPHOID SPECIMENS.

Place.	No. of Samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Akron	18	9	2	4	3		
Alliance	4	1		2	1		
Ashtabula	2	1			1		
Athens	1				1		
Austinburg	3		1	1	1		
Barberton	2			2			
Bath	1	1					
Beaver	1	1					
Bellaire	2	1			1		
Belmont-Mead	1	1					
Canton	1		1				
Castalia	1				1		
Columbiana-Knox	1			1			
Columbus	1				1		
Columbus Grove	1			1			
Conneaut	6	1	3	2			
Copley	1				1		
Coshocton	1				1		
Creston	1			1			
Defiance	1			1			
Eaton	4	2			1	1	
Fredericksburg	1				1		
Glenmont	3	1		2			
Greenfield	2			2			
Hamden Junction	4	2		2			
Jefferson	1				1		
Lima	1			1			
London	3	2			1		
Lucasville	1		1				
Magnolia	1			1			
Malvern	1			1			
Mansfield	14	5	4	2	3		
Marion	10	2	1	4	3		
Medina	4	1		1	2		
McArthur	1			1			
Mt. Vernon	4		1	2	1		
New Berlin	2	1		1			
New Bremen	4	2		1	1		
Piqua	2	1	1				
Plain City	1		1				
Rockwood	2	1			1		
Ross-Buckskin	1				1		
Ross-Concord	2				2		
Salem	1			1			
Sandusky	6		1	3	2		
Sardinia	1					1	
Sebring	2	1		1			
Shreve	4	2		1	1		
South Akron	1	1					
South Charleston	2		1				1
Summit-Copley	1	1					

EXAMINATIONS OF TYPHOID SPECIMENS. — *Concluded*

Place.	No. of Samples.	Result.					
		Male.		Female		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Summit-Greene	1	......	......	1	......	......	......
St. Marys	10	5	1	......	4	......	......
Vandalia	1	1	......	......	......	......	......
Vinton-Clinton	1	......	......	......	1	......	......
Wakefield	1	1	......	......	......	......	......
Washington C. H.	6	3	1	......	1	1	......
Waverly	2	1	......	......	1	......	......
Wayne-East Union	1	......	......	1	......	......	......
Wellington	1	......	......	......	......	......	1
West Alexandria	1	......	......	......	......	......	1
West Elkton	1	......	1	......	......	......	......
Wooster	4	2	1	......	......	1	......
Zaleski	1	......	......	......	1	......	......
Zanesville	2	2	......	......	......	......	......

MISCELLANEOUS EXAMINATIONS.

Lab'y No.	Place.	No. of Samples.	Nature of Sample.	Examined for.	Remarks.
315, 336	Akron	2	Dogs	Rabies	Positive.
292	Alliance	1	Lime	Special Report	
369	Athens	1	Dog	Rabies	Positive.
336	Barnesville	1	Dog	Rabies	Negative.
302, 371	Batavia	2	Alum	Special Report	
403	Bellevue	1	Dog	Rabies	Negative.
278, 279	Brilliant	2	Water	Ferrous sulphate	Negative.
307, 387	Bucyrus	2	Alum	Special Report	
337	Canton	1	Dog	Rabies	Negative.
362	Canton	1	Lime	Special Report	
316	Castalia	3	Spinal fluid	Meningococcus	2 positive, 1 negative.
326	Castalia	1	Water cress	Bacteria	
326	Castalia	1	Growth	Pollution	
382	Chesterland	1	Dog	Rabies	Negative.
347	Columbus	1	Dog	Rabies	Positive.
282	Conneaut	1	Dog	Rabies	Positive.
304, 390	Conneaut	2	Alum	Special Report	
379	Dayton	1	Dog	Rabies	Positive.
300	Dennison	1	Alum	Special Report	
331, 332	Dennison	2	Algae	Byrozoa	Positive.
289, 290, 295, 296, 321-323	East Cleveland	7	Sand	Special Report	
407	East Liverpool	1	Feces	Tubercle bacilli	Positive.
373	East Palestine	1	Water	Zinc and iron	
394, 395	Fostoria	2	Sand	Special Report	
341	Fowler	1	Pus	Not examined	
380	Fremont	1	Dog	Rabies	Positive.
351, 352	Garrettsville	2	Water	Special Report	
308, 385	Geneva	2	Alum	Special Report	
288, 363, 364	Glenville	3	Lime	Special Report	

327	Greenspring	1	Spinal fluid	Bacillus Meningitis	Negative.
329	Greenville	1	Cheese	Ptomaine	Positive.
377	Hudson	1	Dog	Rabies	Positive.
400, 401	Jackson	2	Dogs	Rabies	1 positive. 1 negative.
320	Jefferson	1	Water	Special Report	
283-287	Lancaster	5	Sputum	Pneumococcus & Pfeiffer.	
349	Liberty	1	Dog	Rabies	Not examined.
334	Lima	1	Spinal fluid	Cause	Doubtful.
350	Lorain	1	Alum	Special Report	
353, 354, 391, 392.	Lorain	4	Sand	Special Report	
393	Lorain	1	Clay	Special Report	
397	Lorain	1	Dog	Rabies	Positive.
402	Lorain	1	Spinal cord	Rabies	Negative.
312, 313, 314, 342. 343, 344, 345, 346.	Lynchburg	8	Water	Special Report	
356, 357	Milan	2	Vegetable growth	Spyrogyra and oscelaria.	Positive.
299, 359, 396	Newark	3	Alum	Special Report	
281	New Berlin	1	Dog	Rabies	Positive.
406	New Castle	1	Pork	Trichinae	Negative.
330	North Industry	1	Dog	Rabies	Positive.
293, 368, 370	Oberlin	3	Lime	Special Report	
297, 309, 399	Oberlin	3	Sand	Special Report	
294	Oberlin	1	Soda Ash*	Special Report	
317, 318, 319	Oberlin	3	Sludge	Special Report	
325	Oberlin	1	Boiler scale	Special Report	
404, 405	Oberlin	2	Clay	Special Report	
383	Old Fort	1	Dog	Rabies	Positive.
376	Osnaburg	1	Water	Coli	Positive.
303, 339, 388	Pomeroy	3	Alum	Special Report	
365	Ripley	1	Water	Lead	Positive.
361, 384	Rocky River	2	Alum	Special Report	
328	Sandusky	3	Spinal fluid	Bacillus Meningitis	Negative.
367	Shelby	1	Sludge	Special Report	
240	Springfield	2	Chromosized cat gut		Were sterile.
298	Tippecanoe City	1	Membrane	Diphtheria	Negative.

MISCELLANEOUS EXAMINATIONS — Concluded.

Lab'y No.	Place.	No. of Samples.	Nature of Sample.	Examined for.	Remarks.
280, 289, 310, 333, 335, 378, 398	Toledo	7	Dogs	Rabies	Positive.
324, 375	Toledo	2	Dogs	Rabies	Negative.
305, 355, 389	Upper Sandusky	3	Alum	Special Report	
360	Upper Sandusky	1	Cat	Rabies	Positive.
381	Urbana	1	Horse	Rabies	Negative.
306, 372	Warren	2	Alum	Special Report	
311	Wellston	1	Dog	Rabies	Positive.
348	Weston	1	Dog	Rabies	Negative.
366	Weston	1	Cow	Rabies	Positive.
374	Whipple	1	Water	Coli	Positive.
301, 386	Youngstown	2	Alum	Special Report	
358	Zanesville	1	Blood	Lucocytosis	Not examined.
Total		136			

CO-OPERATIVE WORK WITH THE UNITED STATES DEPARTMENT OF AGRICULTURE.

In the co-operative work with the United States Department of Agriculture, 26 samples of sewage from various localities were examined. Results are given elsewhere in a special report.

EFFICIENCY OF FILTRATION IN PUBLIC WATER SUPPLIES.

In investigating the efficiency of filtration in public water supplies, 558 samples have been examined. Results will be found in a special report.

PRESENT WATER SUPPLIES.

Two hundred and fifty-eight samples collected from various existing public supplies were examined. Results will be given in a special report.

EFFICIENCY OF SEWAGE DISPOSAL PLANTS.

In the study of the efficiency of sewage disposal plants of the state 125 samples were examined. Results will be given in a special report.

EXAMINATIONS OF WATERS.

PUBLIC WATER SUPPLIES.

The analytical results of samples from sources proposed for public supplies or as additions to existing supplies, together with extracts from the report of the bacteriologist and chemist, are given for the various cities and villages considered during the year 1907. For complete information see Report on Proposed Public Water Supplies.

EXAMINATION OF WATER FROM JEFFERSON. PROPOSED SUPPLY.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
5384	Aug. 2, 06	trace	30	trace	none	.018	.216	none	none

Sample Number.	Oxygen Required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on Evaporation. Total.	Residue on Evaporation. Loss on Ignition.	Bacteria. Number per cc.	Bacteria. Colon Present in 50 cc.
5384	.78	40.6	179.	none	1.3	364.	158.	2100	no

Sample No. 5,384. Well No. 1. The chemical results show a ground water comparatively free from fresh organic pollution. The water shows some turbidity, a little sediment, and considerable chlorides, but none of these form a serious objection to a water situated as this is. The water is only moderately hard and the sample gave no scale forming material. In the sediment there is a little iron but as this may clear up with the use of the well it may not prove to be of serious objection. The number of bacteria is high but this frequently occurs in a new well. Intestinal bacteria were not present.

The results would indicate a usable water with some minor objections.

EXAMINATION OF WATER FROM ORRVILLE. PROPOSED SUPPLY.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as Albuminoid Ammonia.	Nitrogen as Free Ammonia.	Nitrogen as Nitrites.	Nitrogen as Nitrates.
7457	Nov. 7 ..	trace	trace	trace	none	.020	.046	none	none

Sample Number.	Oxygen Required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on Evaporation.		Bacteria.	
						Total.	Loss on Ignition.	Number per cc.	Colon Present in 50 cc.
7457	1.20	1.74	252.	46.	.3	324.	43.	1100	no

Sample No. 7457. City drilled well. This water is unusually low in organic matter. It is rather hard but the incrusting constituents are so low that in all probability no trouble would be caused if the water were used for industrial purposes. The chlorine figure is in accordance with the organic findings, being very low. The numbers of bacteria are rather high but not excessively so and intestinal bacteria are entirely absent. The water may be looked upon as a very good one for a public supply.

EXAMINATIONS OF MISCELLANEOUS WATERS

PARTS PER

Sample Number.	Place.	Date Collected. Month.	Day.	Source of Sample.	Cause for Examination.	Color.	Turbidity.	Sediment.
7472	Alvada	11	25	Drilled well	Typhoid		20	slight
7444	Ashville	10	30	Dug well	Typhoid		trace	trace
7445	Ashville	10	30	Dug well	Typhoid		5±	slight
7431	Barberton	10	24	Hydrant	Typhoid		none	trace
7432	Barberton	10	24	Hydrant	Typhoid		none	none
7433	Barberton	10	24	Spring	Typhoid		less than 5	distinct
7461	Barnesville	11	13	Drilled well	Typhoid		5±	trace
7462	Barnesville	11	13	Dug well	Typhoid		none	slight
6334	Bellaire	1	10		Quality		none	none
6335	Bellaire	1	10		Quality			
7263	Bellaire	8	21	Spring	Quality		trace	none
7051	Bellefontaine	7	15	Drilled well	Typhoid	none	10	slight
7205	Belmont-Flushing	8	16	Drilled well	Quality		60	decided
7297	Belpre	8	28	Dug well	School		40	slight
7463	Bluffton	11	13	Well	Typhoid		none	trace
7464	Bluffton	11	13	Well	Typhoid		none	slight
7465	Bluffton	11	13	Well	Typhoid		5±	slight
7353	Bourneville	9	11	Driven well	Typhoid		none	none
7354	Bourneville	9	11	Driven well	Typhoid		none	none
6317	Bowling Green	1	3	Dug well	Typhoid		trace	trace
6906	Bowling Green	6	24	Hydrant	Typhoid		none	none
6907	Bowling Green	6	24	Dug and dril'd well	Typhoid		trace	trace
6908	Bowling Green	6	24	Drilled well	Typhoid		none	none
7492	Buchanan	12	23	Cistern	Typhoid		none	none
7295	Cambridge	8	27	Dug well	Typhoid		trace	trace
7296	Cambridge	8	27	Dug well	Typhoid		10	slight
7475	Cambridge	12	3	Drilled well	Typhoid		30	distinct
6423	Canal Dover	1	21	Well	Typhoid		none	trace
6424	Canal Dover	1	21	Well	Typhoid		trace	trace
6425	Canal Dover	1	21	Well	Typhoid		trace	trace
7044	Canal Dover	7	11	Dug well	Typhoid		none	none
6752	Canton	4	11	Driven well	Typhoid		none	none
7336	Canton	9	3	Driven well	Typhoid		none	none
7419	Canton	10	17	Drilled well	Quality		50	distinct
7497	Carroll-Monroe	12	30	Spring	Typhoid		40	trace
6689	Castalia	4	1	Pond	Quality		20	v'y decided
6690	Castalia	4	1	Pond	Quality			
6691	Castalia	4	1	Stream	Quality		none	none
6692	Castalia	4	1	Drain	Quality		trace	slight
6693	Castalia	4	1	Street R. R. track	Quality		60	decided
6694	Castalia	4	1	Spring	Quality		none	none
6695	Castalia	4	1	Creek	Quality		none	very slight
6797	Cedarville	5	7	Drilled well	Quality		35	slight
6291	Champaign-Adams	8	27	Dug well	Typhoid		trace	none
7876	Chillicothe	6	4	Driven well	Typhoid		none	none
6877	Chillicothe	6	4	Driven well	Typhoid		none	none
6881	Circleville	6	10	Dug well	Typhoid		trace	trace
6495	Circleville	12	25	Dug well	Typhoid		none	none
7496	Circleville	12	25	Well	Typhoid		none	none
7446	Clark-Madison	10	31	Driven well	School		100	distinct
7423	Clarksburg	10	21	Dug well	School		less than 5	trace
7424	Clarksburg	10	21	Dug well	School		none	slight
7425	Clarksburg	10	21	Dug well	School		30	distinct
7156	Clinton-Richland	7	28	Drilled well	Typhoid		100	decided
7374	Columbiana-Perry	9	25	Drilled well	School		excessiv'ly high (unreadable	very heavy
6361	Columbus	1	18	Drilled well	Quality	10	none	none
6569	Columbus	3	6	Well	Quality		100	decided
6874	Columbus	6	3	Driven well	Typhoid		100	trace
7123	Columbus	7	22	Well	Quality	none	40	heavy
7124	Columbus	7	22	Filter effluent	Quality	none	10	decided
7144	Columbus	7	26	Driven well	Quality		40	heavy
7289	Columbus			Well	Quality			
7407	Columbus	10	15		Quality			
7043	Corning	7	11	Cistern	Typhoid		20	slight
7471	Corning	11	23	Dug well	Typhoid		10	distinct
7170	Coshocton	8	10	Spring	Typhoid		none	none
7172	Coshocton	8	10	Spring	Typhoid		trace	trace
7173	Coshocton	8	10	Dug well	Typhoid		none	none
6519	Covington	2	12	Drilled well	Typhoid		5	trace

FROM PRIVATE SUPPLIES AND SPECIAL SOURCES.

MILLION.

Odor.	Oxygen Required.	Nitrogen as Albuminoid Ammonia.	Nitrogen as Free Ammonia.	Nitrogen as Nitrites.	Nitrogen as Nitrates.	Chlorine.	Alkalinity.	Total Solids.	Bacteria in per cc.	Colon Present in 50 cc.
slight	.58	.030	.386	.002	none	7.5	250	1014	2280	no
none	1.39	.042	none	.002	30.0	29.5	369	840	2430	no
none	1.98	.044	.010	.010	20.0	13.9	435	709	......	
none	.72	.014	none	none	4.0	36.5	144	220	100	no
none	.70	.018	none	none	4.0	13.0	146	216	340	no
none	.68	.018	none	none	4.0	21.7	142	275	600	no
none	1.60	.022	.002	.006	20.0	69.9	186	1018	250	yes
aromatic	1.90	.064	.030	.016	10.0	62.5	145	903	6300	yes
trace	.78	.022	.002	.002	12.0	270.0	384	1426	75	no
....	.....	.....	.....	.....	.....	.....	.....	.....	210	no
none	1.25	.022	none	.016	trace	10.0	350	729	3750	yes
none	1.80	.016	.031	.002	none	2.5	278	344	75000	yes
none	2.31	.072	.016	trace	trace	26.1	248	556	380	no
none	1.65	.068	.026	none	1.0	6.9	146	277	8900	yes
none	1.90	.086	.052	.040	4.0	35.5	464	877	1040	yes
peculiar	3.00	.082	.024	.030	trace	71.6	428	885	55	no
peculiar	5.20	.144	.840	.002	none	545.0	264	1357	118	no
none	.90	.044	none	none	6.0	11.3	278	514	300	no
none	.90	.024	none	trace	10.0	37.4	370	806	225	no
none	1.02	.116	none	none	12.0	74.8	484	1059	425	no
none	1.70	.066	.028	none	none	6.5	216	907	3000	no
none	1.90	.052	.012	none	2.0	13.5	232	372	10000	no
none	1.50	.014	.018	none	none	5.6	110	189	8000	no
none	1.65	.044	none	none	5.0	23.9	257	372	6540	no
none	.40	.034	none	.002	6.0	53.5	86	472	575	no
none	3.25	.190	.620	.010	none	114.4	373	824	4500	yes
vegetative	.55	.020	.012	.006	8.0	43.0	138	605	150	no
none	2.73	.120	.018	.006	12.0	364.0	330	1018	8250	yes
none	4.26	.208	.026	.004	20.0	220.0	190	1106	3200	no
none	1.30	.036	.004	.012	10.0	39.0	86	325	630	no
none	1.80	.010	none	.004	none	5.0	169	291	21000	yes
none	none	.018	none	none	24.0	7.5	206	383	2400	no
none	.60	.160	2.220	.020	none	25.6	300	602	70	no
none	4.95	....	......	.002	trace	3.9	168	......	7600	no
trace	1.79	.072	.006	.006	4.0	3.0	26	103	10500	yes
vegetable	8.00	.624	.010	.014	none	8.7	240	.....	......	
....	.....	.....	.....	.....	.....	.....	..	.....	420000	no
none	1.15	.034	none	.003	trace	8.3	224	1741	275	no
none	1.75	.122	.260	.025	4.0	6.7	232	....	1900	no
slightly musty	7.95	.394	.031	.009	2.0	14.8	185	......	1750	no
none	1.20	none	.002	none	none	6.5	231	1740	250	no
none	2.05	.070	.028	.007	trace	17.0	246	....	3900	no
none	.70	.052	.088	none	none	32.5	390	723	65	no
none	1.70	.054	none	.002	6.0	80.9	364	750	1400	yes
none	.80	.032	.016	.120	30.0	41.3	312	926	95	no
none	.10	.024	none	.120	trace	48.2	340	912	45	no
none	.50	.026	.012	none	3.0	51.7	357	602	65	no
none	1.05	.062	.014	.002	trace	46.9	388	794	......	
none	1.28	.018	none	trace	4.0	3.0	278	335	......	
musty	2.48	.028	.520	.010	none	6.1	354	530	80	no
earthy	1.20	.016	none	trace	2.0	8.2	258	349	1650	yes
none	1.50	.020	.002	.010	trace	3.9	392	443	4500	yes
none	4.40	.126	.132	none	none	4.7	312	350	6700	yes
none	4.30	.196	.776	.002	none	4.7	256	768	2700	yes
earthy	2.38	.650	none	none	none	8.7	110	1328	1350	no
none	1.21	.032	.052	none	none	74.0	370	810	sterile	no
none	1.82	.032	.104	trace	none	53.0	390	1154	0	no
none	1.50	.048	.560	none	none	7.0	360	635	25	no
none	2.55	.062	.354	.010	none	23.0	290	1980	225	no
none	1.50	.050	.262	.010	none	16.0	272	1482	3100	no
sulphur	21.00	.078	1.160	none	none	4.7	208	866	......	
....	.....	.....	.....	.....	.....	.....	.....	.....	4200	no
....	.....	.....	.....	.....	.....	.....	.....	.....	390	no
none	10.40	.138	.100	.008	none	none	28	165	26000	no
vegetative	2.30	.088	.004	.002	trace	2.2	48	84	2850	no
none	.60	.012	none	.001	1.0	5.6	242	445	2800	yes
none	.80	.224	trace	.016	4.0	7.4	none	904	270	no
none	2.00	.070	.360	.050	10.0	70.0	158	460	660	no
none	1.62	.042	.002	.006	20.0	161.5	413	1207	25	no

EXAMINATION OF MISCELLANEOUS WATERS FROM

PARTS PER

Sample Number.	Place.	Date Collected. Month.	Day.	Source of Sample.	Cause for Examination.	Color.	Turbidity.	Sediment.
7467	Covington	11	19	Dug well	Typhoid	.....	none	none
7468	Covington	11	19	Drilled well	Typhoid	......	none	trace
7471	Covington	11	28	Dug well	Typhoid	......	none	none
6565	Crawford-Auburn	3	4	Drilled well	Typhoid	.....	none	trace
7418	Cuyahoga-Royalton	10	16	Dug well	Typhoid	.....	5	slight
6909	Darke-Butler	6	25	Driven well	Typhoid	......	25	slight
6336	Darke-Greenville	1	10	Well	Typhoid	.....	none	none
6894	Darke-Greenville	6	19	Dug well	Typhoid	.	30	decided
6895	Darke-Greenville	6	19	Dug well	Typhoid	.....	trace	trace
6896	Darke-Greenville	6	19	Dug well	Typhoid	.....	trace	trace
7341	Darke-Harrison	9	2	Spring	Typhoid	.....	5	trace
7264	Darke-Twin	8	21	Dug well	Typhoid	....	10	decided
6358	Defiance	1	15	Well	Typhoid	.....	none	trace
6873	Delaware	6	3	Driven well	Typhoid	.....	20	trace.
7203	Delaware	8	13	Dug well	Typhoid	.....	trace	trace
7369	Delaware	9	25	Dug well	Typhoid	.....	none	none
6855	Delphos	5	24	Drilled well	Typhoid	. ..	5	slight
7196	East Liverpool	8	12	Spring	Quality	......	none	none
7197	East Liverpool	8	12	Spring	Quality	......	10	trace
7480	East Liverpool	12	9	River	Quality	......	....	....
7481	East Liverpool	12	9	River	Quality	......	....	....
7482	East Liverpool	12	9	Spring	Quality	.....	....	....
7466	East Palestine	11	19	Dug well	Quality	......	5	distinct
7342	East Springfield	9	4	Dug well	Typhoid	....	none	trace
7476	Eaton	12	3	Dug well	Typhoid	......	none	trace
6882	Edison	6	10	Drilled well	Typhoid	.....	10	trace
7429	Erie-Huron	10	23	Drilled well	Typhoid	....	80	heavy
7430	Erie-Huron	10	23	Drilled well	Typhoid	.....	20	distinct
6778	Fairfield-Walnut	5	6	Dug well	Quality	......	none	none
7363	Fairfield-Walnut	9	24	Driven well	Typhoid	......	....	decided
7058	Fostoria	7	17	Drilled well	Typhoid	none	70	distinct
7391	Fostoria	10	2	Drilled well	Typhoid	......	none	none
7392	Fostoria	10	2	Drilled well	Typhoid	......	5	trace
7387	Franklin-Franklin	10	3	Dug well	Quality	....	10	distinct
7420	Franklin Prairie	10	21	Dug well	Typhoid	....	none	none
7393	Franklin-Sharon	10	7	Dug well	Quality	.....	5	distinct
7438	Franklin-Sharon	10	16	Dug well	Quality	.. ..	....	....
7447	Franklin-Sharon	11	1	Dug well	Typhoid	......	none	trace
7448	Franklin Sharon	11	1	Dug well	Typhoid	......	none	none
6354	Fremont	1	14	Drilled well	Quality	.....	trace	slight
6813	Fremont	5	14	Dug well	Typhoid	.....	10	trace
7352	Fremont	9	11	Well	School	......	20	heavy
7402	Fremont	10	10	Well	School	.....	5	slight
7460	Fremont	11	14	Dril'd and Dug well	Typhoid	.....	none	none
6428	Galion	1	28	Drilled well	Typhoid	... ..	none	none
6801	Galion	5	14	Dug well	Typhoid	....	15	slight
6802	Galion	5	14	Dug well	Typhoid	.....	10	slight
6803	Galion	5	14	Dug well	Typhoid	......	trace	slignt
7395	Georgetown	10	8	Spring	Typhoid	......	30	distinct
7396	Georgetown	10	8	Dug well	Typhoid	......	5	slight
7397	Georgetown	10	8	Creek	Typhoid	... ..	100	heavy
7398	Georgetown	10	8	Dug well	Typhoid	......	5	trace
6698	Germantown	4	3	Drilled well	Quality	.....	20	slight
7494	Glenford	12	25	Drilled well	Typhoid	......	30	distinct
7157	Glenmont	7	29	Dug well	Typhoid	.....	none	none
7359	Glenmont	9	18	Dug well	Typhoid	......	none	trace
7127	Greenfield	7	22	Dug well	Typhoid	none	none	none
7128	Greenfield	7	22	Drilled well	Typhoid	none	60	very heavy
7129	Greenfield	7	22	City main	Typhoid	none	none	none
6574	Greenville	3	7	Dug well	Quality	......	trace	trace
6575	Greenville	3	7	Drilled well	Quality	......	5	none
6777	Greenville	5	6	Dug well	Typhoid	......	50	slight
7059	Greenville	7	18	Drilled well	Typhoid	......	none	slight
7317	Greenville	9	2	Dug well	Typhoid	....	trace	trace
7477	Grove City	12	4	Dug well	Typhoid	.....	none	trace
6430	Hamden Junction	1	31	Dug well	Typhoid	... ..	10	slight
7052	Harrisburg	7	17	Dug well	Typhoid	......	none	slight
7053	Harrisburg	7	17	Dug well	Typhoid	......	....	... ...
7054	Harrisburg	7	17	Dug well	Typhoid	....	none	none
6331	Harrison German	1	7	Dug well	Typhoid	......	trace	trace

PRIVATE AND SPECIAL SOURCES — Continued.

MILLION.

Odor.	Oxygen Required.	Nitrogen as Albuminoid Ammonia.	Nitrogen as Free Ammonia.	Nitrogen as Nitrites.	Nitrogen as Nitrates.	Chlorine.	Alkalinity.	Total Solids.	Bacterai in per cc.	Colon Present in 50 cc.
none	2.12	.068	.012	.002	60.0	135.3	366	1064	4750	yes
trace	1.23	.044	.002	.028	20.0	36 9	376	703	750	no
earthy	.85	.026	.008	.014	12.0	11.3	321	458	1820	no
none	1.35	.054	none	none	trace	76.5	292	3262	650	yes
slightly earthy	2.55	.086	.012	.014	60.0	54.3	273	818	6300	yes
none	1.35	.024	.050	.060	none	2.6	386	467	40	no
none	1.39	.020	none	none	1.0	31.6	461	582	900	no
slightly earthy	12.70	.406	.080	.140	40.0	71.2	312	1058	14500	yes
musty	5.80	.178	.028	.012	32 0	18.2	435	591	9500	yes
none	3.60	.110	.050	.018	40.0	36 7	207	593	6000	yes
none	.85	.040	.018	.040	none	5.6	250	358	9050	no
none	1.90	.050	.032	trace	none	23.0	394	534	480	no
trace	2.18	.070	none	trace	trace	209 0	345	948	1100	no
slightly earthy	2.85	.036	.024	.002	4.0	41.3	284	808	400	no
none	2.05	.064	.010	trace	trace	19.5	223	915	1350	no
none	1.68	.062	none	.004	4.0	40.8	408	1122	125	yes
none	3.00	.054	none	none	none	4.5	279	618	8500	no
none	.30	.022	none	none	10.0	36.5	469	322	90	no
none	1.00	.038	none	.002	6.0	50.0	19	402	12300	no
.....	.....	.....	.....	.....	.....	.....	.....	.....	825	no
.....	.....	.....	.....	.....	.....	.....	.....	.....	5100	no
.....	.....	.....	.....	.....	.....	.....	.....	.....	9300	no
none	.....	.....	.....	.002	none	5.4	174	..	......	
none	.70	.030	.004	trace	40.0	28.7	144	722	660	no
vegetative	2.14	.092	.004	.002	50.0	31.7	275	602	4320	no
none	1.90	.120	.006	.010	40.0	167.0	303	1337	6000	yes
strongly aromatic	15.20	.592	1.6	trace	none	3220.0	310	7633	2680	yes
first sulphur on standing putrescible	62.00	.776	unr'adable	none	none	3610.0	344	8815	22	no
none	2.30	.058	.304	070	none	11.5	335	589	375	no
none	1.12	.048	.580	none	none	6.1	292	......	....	
none	.90	.041	.024	none	none	12.6	341	630	30	no
none	3.24	.056	.012	.004	16.0	47.8	336	895	5500	yes
none	2.58	.156	.010	trace	10.0	50 4	284	830	3300	yes
none	.86	.032	none	none	none	4.3	278	376	350	no
trace	1.45	.192	none	.006	80.0	10.0	418	2627	5800	no
vegetative	2.10	.031	.010	trace	trace	3.8	246	337	1200	yes
.....	.....	.....	.....	.....	.....	.....		.....	210	no
none	6.27	.170	none	.008	10.0	24.3	304	393	1300	no
none	2.15	.050	.006	.016	30.0	73.1	322	983	2380	no
musty	1.54	.040	.006	.002	none	70.4	406	734	2400	no
none	1.20	.046	none	none	40.0	23.5	305	735	9800	no
none	3.80	.066	1.040	none	none	3 5	334	418	55	yes
faint	.92	.050	.690	none	none	5.2	326	421	7100	no
none	2.30	.096	.002	.002	12.0	81.4	252	215	930	no
trace	1.43	.054	.222	.014	none	86.0	276	858	4600	no
none	3.25	.040	.022	.200	6.0	6.5	89	234	2900	no
none	1.05	.042	none	.020	12.0	20.0	178	585	50000	yes
none	2.10	.068	.016	2 400	20.0	74.0	237	945	3600	no
putrid	2.68	.152	.066	.018	3.0	21.7	271	552	4800	no
none	3.92	.050	.006	.040	60.0	80.0	161	647	5900	no
musty	12.52	.476	.032	none	none	6.1	116	331	3800	yes
none	3.26	.126	.110	.016	20.0	389.7	44	907	8500	no
oily	.20	none	.054	.007	4.0	4.5	288	405	15300	no
none	.55	.032	.260	trace	trace	3.0	271	443	1000	no
none	none	.006	trace	none	trace	5.6	148	230	500	no
none	.95	.054	.002	.120	40.0	53.0	247	812	4300	yes
none	1.60	.048	.002	none	6.0	35.2	212	534	4500	yes
none	.80	.038	.198	.004	none	3.0	390	738	1800	no
none	.80	.030	none	.002	3.0	5.6	260	610	6200	no
none	.68	.036	.004	.018	20.0	179.0	248	1320	120	no
none	.72	.014	.002	.008	3.0	5.5	300	461	340	no
musty	3.90	.246	.174	.040	16.0	49.5	231	664	7000	no
none	1.25	.052	.002	none	4.0	73.9	382	1120	6700	yes
none	.85	.018	.020	.002	none	6.9	328	511	390	no
slightly vegetative	1.01	.034	.006	trace	.2	126.0	410	982	1700	no
none	1.86	.110	none	.008	.6	35 0	24	341	1350	no
none	.70	.058	.002	.004	16.0	186.9	316	1540	620	no
.....	.....	.....	.....	.....	.....	.....	.....	.....	200	yes
none	1.10	.060	trace	.002	14.0	30.8	242	667	750	yes
rank vegetable	.61	.018	.002	none	1 0	11.0	18	65	630	no

EXAMINATION OF MISCELLANEOUS WATERS FROM

PARTS PER

Sample Number.	Place.	Date Collected. Month.	Day.	Source of Sample.	Cause for Examination.	Color.	Turbidity.	Sediment.
6883	Haydenville	6	11	Dug well	Typhoid	......	....	....
7473	Hocking-Washing'n	11	26	Dug well	Typhoid	....	10	trace
7489	Holmes-Berlin	12	19	Spring	Typhoid	......	none	none
6543	Huron	2	20	Dug well	Typhoid	......	5	distinct
6843	Jackson	5	17	Well	Typhoid	......	....	....
6545	Jefferson Springs	2	11	Spring	Quality	trace	none	none
7198	Jersey	8	12	Dug well	Typhoid	.....	none	none
7199	Jersey	8	12	Dug well	Typhoid	......	trace	trace
7409	Jerusalem	10	17	Drilled well	Typhoid	......	none	trace
6445	Kenton	2	1	Driven well	Typhoid	.....	10	decided
6446	Kenton	2	1	Cistern	Typhoid	....	60	very heavy
7343	Kenton	9	4	Dug well	Typhoid	.....	trace	trace
7357	Kenton	9	16	Dug well	School	......	none	slight
7260	Knox-Hilliar	8	20	Dug well	Typhoid	......	10	decided
7261	Knox-Hilliar	8	20	Dug well	Typhoid	.....	trace	trace
6696	Lancaster	4	1	Driven well	Typhoid	....	none	none
6520	Lewisburg	2	16	Dug well	Typhoid	......	5	trace
7426	Lexington	10	22	Driven well	Typhoid	.....	10	distinct
7362	Licking-Union	9	21	Drilled well	Typhoid	.....	none	none
7400	Lima	10	10	Dug well	Typhoid	......	10	slight
6357	Lisbon	1	16	Dug well	Typhoid	......	....	....
6427	Loudenville	1	21	Dug well	Typhoid	....	none	none
7414	Louisville	10	18	Dug well	Typhoid	......	10	slight
7415	Louisville	10	18	Dug well	Typhoid	......	none	trace
7440	Lucas	10	29	Spring	Typhoid	......	none	none
7470	Lyons	11	20	Dug well	Typhoid	.....	none	trace
6355	Marysville	1	15	Drilled well	Quality	15	40	slight
6356	Marysville	1	15	Drilled well	Quality	15	20	slight
6498	Maumee	2	4	Dug well	Typhoid	.....	none	trace
6750	Maumee	4	10	Dug well	Typhoid	.....	none	none
6751	Maumee	4	10	Dug well	Typhoid	....	none	none
6316	Mechanicsburg	1	2	Dug well	School	...	15	heavy
6564	Mechanicsburg	3	4	Driven well	Typhoid	.....	100	decided
6938	Meigs-Salisbury	7	4	Driven well	Sickness	.....	35	decided
7408	Miamisburg	10	15	Dug well	Typhoid	......	none	trace
6332	Miami-Spring Creek	1	7	Dug well	Typhoid	......	trace	trace
6697	Middleport	4	1	Cistern	Typhoid	....	20	slight
7351	Millersport	9	11	Dug well	Typhoid	......	none	trace
6628	Miltonsburg	3	17	Dug well	Typhoid	10	none	none
6597	Montezuma	3	13	Cistern	Typhoid	...	100	heavy
7366	Montezuma	9	21	Dug and dril'd well	Typhoid	......	25	decided
7367	Montezuma	9	24	Cistern	Typhoid	.....	trace	slight
7379	Montgomery-Butler	9	30	Spring	Typhoid	....	noue	none
7380	Montgomery-Butler	9	30	Spring	Typhoid	.....	5	distinct
7498	Montgomery-Clay	12	30	Dug well	Typhoid	......	none	none
6315	Montgomery-Miami	1	1	Well	School	.. ..	100	heavy
6330	Montgomery-Miami	1	6	Dug well	Typhoid	.....	none	none
6937	Montgomery-Perry	7	4	Dug well	Typhoid	......	none	none
7344	Morrow	9	9	Driven well	Typhoid	....	trace	trace
6870	Morrow-Franklin	5	29	Dug well	Typhoid	......	none	none
7394	Mt. Gilead	10	8	Dug well	Typhoid	......	none	none
7401	Mt. Hope	10	10	Spring	Typhoid	......	none	none
7453	Nevada	11	5	Driven well	Typhoid	......	40	distinct
6447	New Alexandria	2	4	Dug well	Typhoid	......	trace	slight
6716	Newark	4	4	Driven well	Typhoid	....	trace	very slight
7458	Newark	11	11	Driven well	Typhoid	......	....	....
7292	New Athens	8	26	Dug well	Typhoid	....	10	trace
7204	New Holland	8	13	Dug well	Typhoid	....	10	trace
7162	New Lexington	8	1	Dug well	Typhoid	.....	trace	trace
7163	New Lexington	8	1	Cistern	Typhoid	......	trace	trace
7307	New Lexington	8	30	Cistern	Typhoid	.....	trace	trace
7372	New Lexington	9	26	Dug well	Typhoid	.....	none	none
7422	New Philadelphia	10	22	Dug well	Typhoid	.....	none	none
7381	North Baltimore	9	30	Well	Typhoid	......	5	slight
439	North Baltimore	10	29	Drilled well	Typhoid	......	100	very heavy
7844	Oak Harbor	5	17	Cistern	Typhoid	....	5	none
6880	Orrville	6	10	Dug well	Typhoid	......	10	trace
6159	Ottawa	7	29	Drilled well	Quality	......	110	slight
7360	Oxford	9	19	Dug well	Typhoid	......	5	slight
7875	Paris	6	3	Dug well	Typhoid	......	none	none
6483	Paulding	12	9	Well	School	.....	....	....

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PRIVATE AND SPECIAL SOURCES — Continued.

MILLION.

Odor.	Oxygen Required.	Nitrogen as Albuminoid Ammonia.	Nitrogen as Free Ammonia.	Nitrogen as Nitrites.	Nitrogen as Nitrates.	Chlorine.	Alkalinity.	Total Solids.	Bacterai in per cc.	Colon Present in 50 cc.
...	.70	.016	none	...	...	...	104	...	25	no
earthy	.65	.022	none	trace	4.0	12.8	none	158	2370	no
none	1.00	.008	none	none	2.0	3.9	228	274	9360	no
none	3.69	.096	.014	.001	10.0	1070.0	255	2541	350	no
...	...	...	...	...	...	...	...	...	27500	no
none	.77	.020	.122	.160	none	trace	154	273	2200	no
none	1.30	.090	none	.080	6.0	26.0	286	601	3900	no
musty	1.40	.030	.032	.014	none	31.7	262	807	1250	no
none	.50	.004	none	.002	10.0	21.7	232	368	210	no
none	1.43	.030	.381	.024	none	1.2	342	790	30	no
strong musty	14.24	.770	.640	none	none	.4	20	140	7300	no
none	1.70	.078	trace	.080	30.0	84.8	100	1295	1500	no
none	2.50	.078	.032	.004	2.0	19.5	236	530	650	yes
none	1.10	.050	none	.002	trace	3.9	294	425	825	yes
none	1.45	.012	none	.002	2.0	4.7	154	397	1800	yes
none	1.25	.024	none	.200	16.0	52.5	344	184	430	no
none	2.00	.086	.002	none	18.0	61.0	312	674	18000	no
none	.80	.008	.066	none	none	3.0	304	532	90	no
musty	3.00	.034	.010	.002	2.0	47.8	291	...	...	
aromatic	9.30	.100	.012	.010	4.0	80.0	348	951	450	yes
...	1.94	...	...	.008	24.0	80.0	...	...	6000	no
trace	.87	.018	.004	.002	18.0	161.6	270	819	680	no
none	1.00	.034	trace	none	trace	27.4	304	532	990	yes
none	2.30	.104	none	.060	24.0	189.2	282	1335	1350	no
peculiar	.48	.008	none	none	6.0	3.4	118	..	550	no
earthy	1.57	.074	.002	.004	30.0	28.0	310	678	4350	yes
faint earthy	1.56	.016	.560	none	none	62.4	275	1185	95	no
faint earthy	1.41	.058	.500	trace	none	36.1	272	1431	17	no
none	4.12	.082	trace	trace	2.0	155.0	322	1042	800	no
trace	1.55	.118	none	none	20.0	15.5	397	1035	2000	no
none	4.60	.292	none	.050	30.0	115.5	333	1491	5500	no
earthy	1.99	.076	none	none	8.0	47.2	652	1110	450	no
none	.65	.012	.218	none	none	2.0	369	541	none	no
none	1.00	.016	.010	trace	none	18.7	170	518	2050	no
none	2.60	.008	none	trace	10.0	11.3	306	497	1370	no
none	1.62	.050	trace	none	3.0	182.0	367	865	1650	no
aromatic	5.35	.140	.130	.002	2.0	1.30	64	122	1500	no
vegetable	1.55	.028	.070	none	none	21.70	320	1008	900	yes
none	3.10	.192	.010	.002	20.0	63.5	130	515	8700	yes
strong vegetable	7.15	.220	.074	.013	10.0	52.5	169	....	45000	yes
putrescible	3.20	.026	.002	.240	none	13.0	139	1754	1190	yes
none	7.80	.338	.298	.006	none	3.4	29	76	4050	no
none	1.00	.030	none	none	2.0	4.7	302	392	1900	yes
none	2.00	.218	.010	.008	2.0	3.4	294	434	360	yes
none	2.54	.106	.002	.004	100.0	452.4	376	1600	12120	no
musty	3.63	.110	.040	none	none	940.0	244	1215	4750	no
trace	2.08	.084	.002	.006	14.0	260.0	343	1020	1600	no
none	2.70	.086	.026	.004	24.0	63.0	306	556	5800	yes
none	.80	.024	.002	none	2.0	40.0	282	512	350	no
none	2.85	.088	.016	.004	20.0	60.8	384	1015	6200	no
none	2.04	.070	none	trace	2.0	80.0	382	784	3600	no
none	.48	.012	.002	none	2.0	4.3	202	271	10000	yes
none	1.18	.026	.158	.002	none	3.0	353	778	210	no
none	.97	.062	trace	.002	5.0	1.3	273	379	2000	no
none	.40	.042	none	.002	36.0	53.0	277	961	650	no
...	...	...	...	...	...	...	...	...	2600	no
none	4.80	.016	.030	.004	2.0	3.9	156	203	1100	yes
none	2.72	.044	.006	.012	30.0	96.0	210	1018	...	
none	.40	.034	.008	.002	10.0	22.1	16	422	1400	yes
slight musty	6.80	.064	.062	.060	trace	3.0	52	128	1300	no
none	.95	.050	none	none	2.0	2.1	30	77	1750	yes
none	1.38	.086	.004	trace	4.0	11.3	16	473	1320	no
musty	.70	.010	none	trace	trace	5.6	232	383	300	no
woody	5.80	.090	.360	none	none	51.8	206	942	480	no
none	5.75	.168	.324	none	none	56.5	310	726	1700	yes
none	2.25	.054	.202	trace	2.00	2.0	217	70	4050	no
none	1.65	.024	.026	none	trace	241.0	294	2860	4800	yes
none	2.00	.026	.124	.010	none	6.5	140	615	800	no
none	2.85	.101	.014	.002	10.0	50.4	394	671	5600	no
none	.80	.040	.046	.040	30.0	21.8	54	418	800	no
...	...	...	...	...	...	...	...	...	90	no

EXAMINATION OF MISCELLANEOUS WATERS FROM

PARTS PER

Sample Number.	Place.	Date Collected. Month.	Day.	Source of Sample.	Cause for Examination.	Color.	Turbidity.	Sediment.
7481	Paulding	12	9	Well	School	.....	....	....
7487	Perry-Clayton	12	12	Spring	Typhoid	.....	10	none
6544	Perry-Harrison	2	27	Dug well	Typhoid	.....	5	slight
7364	Pickaway-Deer Creek	9	24	Dug well	Typhoid	.....	25	decided
7288	Pickaway-Salt Creek	8	24	Dug well	Typhoid	.....	less than 5	slight
7451	Piqua	11	4	Dug well	Typhoid	.....	10	distinct
6775	Preble-Harrison	4	29	Well	Typhoid	.....	none	none
7421	Preble-Harrison	10	21	Dug well	Typhoid	.....	30	slight
6773	Reynoldsburg	4	23	Dug well	Typhoid	.....	trace	trace
7459	Rising Sun	11	11	Drilled well	Typhoid	.....	none	trace
6511	Ross-Greene	2	11	Spring	Typhoid	.....	slight	slight
7385	Rushsylvania	10	2	Driven well	Typhoid	.....	20	distinct
7386	Rushsylvania	10	2	Driven well	Typhoid	.....	none	very slight
7388	Sandusky-Jackson	10	2	Dug well	Typhoid	.....	10	distinct
6936	Sandusky-Scott	7	3	Drilled well	Typhoid	.....	35	slight
7389	Sandusky-Scott	10	2	Drilled well	Typhoid	.....	5	trace
7390	Sandusky-Scott	10	2	Drilled well	Typhoid	.....	none	mere trace
6448	Scioto-Brush Creek	2	4	Dug well	Typhoid	.....	none	none
6449	Scioto-Brush Creek	2	4	Well	Typhoid	.....	10	trace
6450	Scioto-Brush Creek	2	4	Dug well	Typhoid	.....	none	none
7318	Shelby	9	2	Dug well	Typhoid	.....	10	trace
7349	Shreve	9	11	Hydrant	Typhoid	.....	none	none
7350	Shreve	9	11	Driven well	Typhoid	.....	20	slight
6429	Sinking Spring	1	29	Spring	Typhoid	.....	trace	slight
6774	Somerset	4	23	Dug well	Typhoid	.....	none	none
6798	Somerset	5	7	Dug well	Typhoid	.....	trace	trace
7406	Stark-Jackson	10	13	Spring	Typhoid	.....	none	trace
7485	Stark-Lake	12	10	Dug well	Typhoid	.....	none	slight
6776	Stark-Nimishillen	5	1	Dug well	Typhoid	.....	none	none
7293	Stark-Nimishillen	8	27	Dug well	Typhoid	.....	10	slight
7294	Stark-Nimishillen	8	27	Spring	Typhoid	.....	....	....
7368	Stark-Nimishillen	9	25	Drilled well	Typhoid	.....	40	decided
6362	Steubenville	1	17	Drilled well	Quality	.....	none	none
6513	Steubenville	2	11	.....	Quality	none	none	none
6746	Steubenville	4	9	Drilled well	Typhoid	.....	30	distinct
7478	Strasburg	12	4	Hydrant	Typhoid	.....	none	none
7479	Strasburg	12	4	Driven well	Typhoid	.....	none	trace
6453	Summit Bath	2	6	Dug well	Typhoid	.....	trace	trace
6454	Summit-Bath	2	6	Dug well	Typhoid	.....	none	none
7382	St. Bernard	9	30	Cistern	School	.....	none	none
7373	St. John	9	25	Well	Quality	.....	30	heavy
6856	St. Marys	5	27	Well	Quality	.....	5	trace
6857	St. Marys	5	27	Spring	Quality	.....	none	none
7346	Tacoma	9	9	Dug well	Typhoid	.....	none	none
7347	Tacoma	9	9	Spring	Typhoid	.....	none	none
7348	Tacoma	9	9	Spring	Typhoid	.....	10	none
7370	Tacoma	9	26	Tap	Typhoid	.....	none	trace
7371	Tacoma	9	26	Spring	Typhoid	.....	none	trace
6847	Tippecanoe City	5	20	Driven well	Quality	.....	80	decided
7410	Trumbull-Vernon	10	10	Dug well	Typhoid	.....	10	slight
7411	Trumbull-Vernon	10	10	Dug well	Typhoid	.....	none	none
7168	Union City	8	6	Drilled well	Typhoid	.....	80	slight
6916	Unionport	7	1	Drilled well	Typhoid	.....	30	slight
6917	Unionport	7	1	Drilled well	Typhoid	.....	trace	trace
7384	Unionport	10	1	Drilled well	Typhoid	.....	none	none
6899	Van Wert-Washing'n	6	20	Dug well	Typhoid	.....	none	none
7365	Washington C. H.	10	25	Dug well	Typhoid	.....	....	....
7399	Washington C. H.	10	8	Dug well	Typhoid	.....	20	slight
7319	Wash'n-Grandvwiew	9	2	Dug well	Typhoid	.....	35	slight
7158	Washington-Palmer	7	28	Well	Typhoid	.....	10	trace
7375	Wayne-East Union	9	30	Dug well	Typhoid	.....	none	none
7376	Wayne-East Union	9	30	Dug well	Typhoid	.....	none	none
7377	Wayne-East Union	9	30	Dug well	Typhoid	.....	none	trace
7378	Wayne-East Union	9	30	Dug well	Typhoid	.....	none	very slight
6918	West Alexandria	7	1	Dug well	Typhoid	.....	trace	trace
6576	Westerville	3	7	Dug well	Typhoid	.....	5	trace
6747	Westerville	4	10	Dug well	Typhoid	.....	none	none
6748	Westerville	4	10	Dug well	Typhoid	.....	none	none
6749	Westerville	4	10	Dug well	Typhoid	.....	....	....
6892	West Farmington	6	18	Well	Quality	.....	30	slight
7405	West Jefferson	10	14	Dug well	Quality	.....	none	none

PRIVATE AND SPECIAL SOURCES — Continued.

MILLION.

Odor.	Oxygen Required.	Nitrogen as Albuminoid Ammonia.	Nitrogen as Free Ammonia.	Nitrogen as Nitrites.	Nitrogen as Nitrates.	Chlorine.	Alkalinity.	Total Solids.	Bacteria in per cc.	Colon Present in 50 cc.
.....	.....	.....	.....	.....	.....	.....	.....	.....	700	no
vegetative	.95	.034	.038	.006	4.0	2.6	none	77	165	no
none	.90	.020	.006	.002	10.0	16.0	209	378	700	no
none	1.59	.036	.144	none	none	72.2	416	860	1600	yes
none	2.80	.076	.330	.240	18.0	132.2	274	1035	11000	yes
vegetable	1.26	.048	.032	.036	20.0	41.7	280	636	2400	no
none	5.45	.228	none	trace	50.0	36.2	454	876	3500	no
faint	1.10	.030	.210	.002	none	72.2	370	464	60	yes
faint	1.50	.020	none	.001	12.0	12.8	244	485	1800	no
none	2.60	.112	.002	.002	10.0	45.4	358	807	140	yes
none	.51	.024	none	none	4.0	1.9	253	343	1375	no
none	1.00	.026	.014	none	none	8.7	336	857	3400	yes
vegetative	.84	.030	.026	.004	none	4.3	288	535	550	no
putrid	3.14	.142	.224	.040	2.0	23.4	276	570	1450	yes
musty	1.00	.012	.016	none	none	3.0	314	433	325	no
none	2.31	.058	.046	none	none	33.9	304	616	660	yes
none	none	.022	.264	none	none	10.4	282	478	670	no
faint vegetative	1.92	.066	.002	trace	8.0	197.2	51	377	2400	no
vegetative	3.74	.412	1.140	.002	6.0	38.	38	188	1620	no
trace	1.57	.064	.002	none	6.0	5.	5	132	1260	yes
none	1.65	.092	.004	trace	2.0	22.6	334	408	19500	no
none	1.65	.016	.010	.080	trace	63.5	240	437	80	no
musty	1.50	.016	.008	none	none	26.1	304	630	55	yes
none	1.14	.022	none	none	.2	7.4	298	285	1500	no
none	1.25	.028	none	.010	8.0	30.7	60	472	2600	no
none	.60	.078	none	none	16.0	137.5	184	1077	1200	no
slight vegetative	.80	.084	010	.006	4.0	6.1	144	222	92	no
slight vegetative	1.32	.090	none	.006	40.0	61.7	145	663	6300	no
faint	3.15	.114	.002	.030	70.0	217.5	288	.....	1200	yes
none	.80	.054	.030	.004	4.0	23.3	52	218	1200	no
.....	1.00	.032	.016	.002	2.0	13.9	178	.....	1580	yes
none	1.00	.018	.018	none	none	3.4	158	269	580	no
none	.57	.028	.014	.012	3.0	11.4	39	116	8400	no
none	.52	.012	.010	.010	2.0	6.0	29	94	1900	no
earthy	1.40	.082	.120	.070	30.0	60.0	233	888	7000	no
vegetative	.58	.018	none	none	trace	6.1	141	202	115	no
vegetative	.43	.024	.002	.020	none	3.9	186	241	22	no
trace	5 36	.174	.012	.010	24.0	178.5	296	999	3450	no
faint	1.50	.040	.002	.002	6.0	23.4	116	311	1100	no
none	2.80	.164	1.060	.700	12.0	5.2	none	178	19500	yes
vegetative	15.04	1.520	2.160	.200	18.0	62.6	834	1350	4400	yes
none	3.30	.094	none	none	none	22.1	292	1003	9000	no
none	2.40	.040	.172	.020	5.0	51.7	322	972	3	no
none	.60	.030	.002	.004	6.0	30.4	84	410	250	no
none	.50	.032	none	.004	2.0	4.3	140	247	15000	no
none	.85	.028	.006	.004	4.0	8.7	99	294	18000	yes
musty	.97	.036	.022	trace	16.0	9.5	112	327	2460	yes
musty	.75	.018	none	none	14.0	9.5	118	321	45	no
none	2.55	.090	.310	none	none	3.5	358	551	1350	no
none	5.40	.134	.002	none	4 0	10 0	52	222	1300	yes
none	2.70	.062	.002	.016	12.0	34 8	182	465	2200	yes
musty	2.40	.090	.002	trace	20.0	25.6	412	961	1500	yes
none	1.70	.050	.006	trace	20.0	16.9	66	330	4500	yes
none	1.00	.030	.006	.002	20.0	20.4	85	665	800	yes
none	none	.024	.016	.030	14.0	117.4	296	1241	500	no
none	1.50	.052	.066	.002	none	7.4	206	634	900	yes
.....	.....	.....	.....	.....	.....	.....	.....	.....	13300	yes
vegetative	1.04	.038	.126	.040	2.0	35.6	400	695	625	no
none	5.95	.268	.028	none	none	8 2	82	222	6300	yes
none	.90	.052	.002	.010	30.0	54.8	194	770	4600	no
none	.82	.012	none	none	4.0	[illegible]7.8	36	136	600	yes
none	.90	.032	none	.004	6.0	87.8	116	593	950	yes
none	.88	.032	010	.008	2.0	46.9	320	520	2450	yes
vegetative	.80	.022	.010	trace	2.0	5.6	96	188	660	yes
none	3.00	.066	.010	.030	40.0	73.0	244	1175	14500	no
none	2.28	.100	.026	.044	24.10	105.7	286	836	4200	yes
faint	1.40	.030	.002	none	14 0	36.0	391	957	90	no
none	.30	.104	.004	.040	34.0	68.0	481	1520	270	no
.....	.....	.....	.....	.....	.....	43.5	.....	.....	1900	no
none	1.60	.042	.560	.006	6.0	41.1	176	969	1100	no
none	.88	.018	none	none	8.0	59.2	342	666	300	no

EXAMINATION OF MISCELLANEOUS WATERS FROM

PARTS PER

Sample Number.	Place.	Date Collected. Month.	Day.	Source of Sample.	Cause for Examination.	Color.	Turbidity.	Sediment.
7493	West Jefferson.......	12	24	Dug well.....	Typhoid ...	.. ...	20	slight
6900	West Manchester....	6	24	Dug well	Typhoid ...	.....	20	slight
6901	West Manchester....	6	24	Dug well.	Typhoid ...	.....	trace	trace
6913	West Manchester....	6	26	Dug well....	Typhoid ...	......	10	trace
6914	West Manchester....	6	26	Drilled well	Typhoid ...	...	trace	trace
6915	West Manchester....	6	26	Driven well........	Typhoid ...	......	10	trace
7383	West Union.... ...	10	1	Driven well	Typhoid ...	....	....	....
6512	Woodsfield...........	2	9	Dug well...... ...	Typhoid ...	......	slight	slight
7486	Wooster..............	12	10	Dug well.	Typhoid ...	......	10	distinct
7290	Wyandot Pitt........	8	26	Spring	Typhoid ...	.....	40	decided

PRIVATE AND SPECIAL SOURCES — Concluded.

MILLION.

Odor.	Oxygen Required.	Nitrogen as Albuminoid Ammonia.	Nitrogen as Free Ammonia.	Nitrogen as Nitrites.	Nitrogen as Nitrates.	Chlorine.	Alkalinity	Total Solids.	Bacteria in per cc.	Colon Present in 50 cc.
faint	3.05	.078	none	trace	3.0	85.6	12	310	. .	
none	1.40	.050	.550	none	none	12 6	308	475	1700	no
none	2 90	.104	.026	.120	20.0	15.6	374	839	3800	no
none	1 20	.041	.496	.002	2.0	5.5	395	478	20000	no
none	1 20	.039	.054	none	none	47 0	276	536	15000	no
none	1.25	.028	.031	none	none	2.5	302	337	45000	no
....	....	....	.... .	....	....	....	....	. ..	2280	yes
vegetative	3.19	.120	.010	.002	16.0	46.1	140	474	6200	no
earthy	.15	.028	none	trace	9.0	6.5	77	179	5340	no
none	1 00	.148	.640	none	none	6.5	290	1302	125000	yes

CITY AND VILLAGE HEALTH OFFICERS.

Appointed by Council to Serve in Lieu of a Board of Health.

Appointed by the Board of Health.

CORRECTED TO APRIL 22, 1908.

HEALTH OFFICERS OF CITIES AND VILLAGES.

Place.	Health Officer.
Aberdeen	Dr. S. A. Laughlin.
Ada	J. H. Morrow.
*Adamsville	H. E. Darner.
*Addyston	Dr. J. H. Haire.
Adelphi	W. S. Koch.
*Agosta P. O. (New Bloomington)	Harry E. Snyder.
Akron	Dr. A. A. Kohler.
Albany	Walker Neff.
*Alexandria	Elim M. Shaub.
Alger	C. C. Neal.
Alliance	Dr. L. A. Crawford.
Alvordton	Dr. T. E. Schrider.
Amanda	George Boerstler.
*Amelia	Dr. Homer C. Behymer.
Amesville	J. C. Snedeker.
Amsterdam	Dr. L. D. Allen.
Andover	Dr. F. L. Sargent.
*Anna	Dr. D. R. Milliette.
*Ansonia	Dr. J. C. Poling.
*Antioch	Dr. D. W. Lowe.
*Antwerp	Andrew J. Schilb.
*Apple Creek	A. A. Reinhardt, V. S.
*Arcadia	W. W. Moore.
Arcanum	Jas. A. Wallace.
Archbold	August Ruihley.
Arlington	Solomon Bates.
*Arlington Heights	Jess R. Miller.
Arnettsville (Pittsburg P. O.)	Dr. J. O. Starr.
*Ashland	E. A. Kauffman.
*Ashley	James Hall.
Ashtabula	Dr. A. W. Hopkins.
Ashville	John Johnson.
*Athalia	Dr. S. V. McCown.
Athens	Dr. J. M. Higgins.
*Attica	Dr. C. A. Force.
Avon	Dr. John R. Pipes.
*Bainbridge	Dr. J. H. Pake.
*Bairdstown	D. M. Cassner.
Baltic	John Hoobler.
Baltimore	L. K. Davis.
*Barberton	Dr. Geo. A. Brown.
Barnesville	W. T. Evans.
Barnhill	John Stevenson.
Basil	T. F. Basch.
Batavia	C. H. Crane.
Batesville	George Lashley.

* In lieu of a board of health.

Place.	Health Officer.
*Bay (North Dover P. O.)	Geo. L. Osborn.
Beach City	Theodore F. Stamm.
Beallsville	Dr. O. M. Keesor.
*Beaver	Dr. A. L. McAllister.
Beaver Dam	Dr. J. B. Haines.
Bedford	Dr. W. H. Black.
Bellaire	Dr. D. W. Boone.
Bellbrook	R. M. Martz.
Belle Centre	W. G. Oliphant.
Bellefontaine	Dr. Frank B. Kaylor.
*Belle Valley	Dr. Frank R. Dew.
Belleville	Dr. J. W. Kelly.
Bellevue	Dr. J. F. Miller.
Belmont	James A. Burson.
Belmore	Dr. G. B. Adrian.
Beloit	R. H. Oswalt.
Belpre	Jesse McGrew.
Benton Ridge	Dr. R. D. Whisler.
Berea	A. A. Smith.
*Bergholz	Thomas McConaughy
*Berlin X Roads	Henry Davis.
*Berlin Heights	Dr. G. W. Hine.
*Berne P. O. (Carlisle)	W. R. Bromhall.
*Bethel	Dr. W. E. Thompson.
*Bettsville	C. G. Norton.
Beverly	Fred H. Hart.
*Blakeslee	Jas. B. Lauchlen.
*Blanchester	U. B. Chambers.
Bloom Center	Dr. O. C. Wilson.
*Bloomdale	G. W. Urie.
Bloomfield (Bloomingdale P. O.)	E. R. Blackburn, Clerk.
*Bloomingsburg	H. W. Worrell.
Bloomville	D. W. Fellers.
Bluffton	Dr. John J. Sutter.
*Bolivar	Wm. E. Lash.
*Boston (Owensville P. O.)	Edward H. Thirey.
*Botkins	G. A. Biebesheimer.
Bourneville	Dr. J. A. Van Winkle.
*Bowerstown	H. Karn.
*Bowersville	J. E. Steward.
Bowling Green	John Troxel.
*Bradford	B. H. Sothoron.
*Bradner	Amos Chronister.
*Bratnahl	J. G. Newkirk.
*Bremen	T. L. Householder.
*Bridgeport	Oliver Porter.
Brilliant	A. McIntire.
*Brinkhaven P. O. (Gann)	Jacob Fendrick.
Brooklyn P. O. (South Brooklyn)	R. E. Stickney.
*Brooklyn Heights	Joseph E. Richardson.
Brookville	A. M. Campbell.
*Broughton	James Boroff.

* In lieu of a board of health.

Place.	Health Officer.
Bryan	August Heidley.
*Buchtel	Ralph Ball.
Buckeye City	F. M. Welker.
Buckland	Dr. R. W. Sharp.
Bucyrus	Dr. A. H. McCrory.
Buffalo (Hamlet)	Charley Frye.
*Burbank	A. W. Hoffman.
Burkettsville	Dr. B. G. Inman.
Burton	Dr. A. D. Warner.
*Butler	D. J. McCready.
*Butlersville	Elias Smith.
Byesville	J. R. Hildebrand.
*Cadiz	William H. Lemmon.
*Calais	J. R. Johnson, Acting.
*Caldwell	Dr. J. L. Gray.
Caledonia	Noah Lee.
Cambridge	Dr. W. T. Ramsey.
*Camden	Dr. Geo. W. Homsher.
*Canal Dover	H. H. Prince.
Canal Fulton	Leonard Pfaffle.
*Canal Winchester	Dr. J. W. Shook.
Canfield	John C. Starr.
*Cannelville (Dillons P. O.)	Frank W. Dawson.
Canton	Dr. Frank DeHinden.
*Cardington	C. F. Axthelm.
*Carey	Joseph F. Wonder.
*Carlisle (Berne P. O)	W. R. Bromhall.
Carroll	Dr. H. L. Bounds.
Carrollton	Dr. A. H. Hise.
*Carthage	Dr. Odus D. Simmons.
*Casstown	Dr. W. W. Baker.
Catawba	Forest Mahar.
*Cecil	Dr. F. W. McNamara.
Cedarville	Samuel Albright.
Celina	Dr. Joseph Sager.
Centerburg	Dr. S. Robert Best.
*Centerville (Montgomery Co.)	Dr. B. W. Dudley Keever.
Centerville (Thurman P. O.) Gallia Co.	
*Chagrin Falls	D. A. Groves.
*Chambersburg (Eureka P. O.)	Dr. W. J. Fletcher.
*Chardon	John Binley Grimm.
*Chatfield	Samuel Lutz.
*Chesterhill	William Johnson.
*Chesterville	Dr. J. D. Varney.
*Cheviot	Charles Craig.
Chicago Junction	Dr. A. R. Kauffman.
*Chickasaw	John P. Stroeger.
Chillicothe	Dr. W. S. Scott.
Cincinnati	Dr. Mark Brown.
Circleville	Harry S. Sheets.
Clarington	John E. Morrill.
*Clarksburg	Tilden Norris.

* In lieu of a board of health.

Place.	Health Officer.
*Clarksville	Perry Wilson.
Cleveland	Dr. Martin Freidrich.
*Cleveland Heights	Lorenzo Brockway.
*Cleves	Dr. W. C. Hughes.
*Clifton	Dr. David E. Spahr.
Clinton (Fitchville P. O.)	S. M. Sly.
*Cloverdale	Dr. J. E. Stephan.
Clyde	F. G. Tuttle.
*Coal Grove	Dr. M. E. Ramey.
*Coalton	J. C. Duncan.
Coalwater	Dr. A. Bowman.
*College Corner	George Bargett.
College Hill	J. E. Deininger.
*Collinwood	Dr. Jerome D. Dodge.
Columbiana	J. D. Holloway.
Columbus	Dr. Elmer G. Horton.
*Columbus Grove	Dr. N. E. W. Seaman.
*Commercial Point	Leslie Harlor.
Congress	L. O. Weiler.
Conneaut	Dr. O. N. Warner.
*Continental	C. Corbitt.
Convoy	Dr. C. D. Sidle.
Coolville	Dr. A. M. Frame.
Copley	....
Corlett	Dr. A. M. Cheetham, Cleveland.
*Corning	Wm. Anderson.
Cortland	Dr. B. G. McCurley.
*Corwin	Jacob I. Clark.
Coshocton	W. B. Miller.
Covington	Wm. E. Westfall.
Crestline	Dr. C. A. Marquart.
*Creston	Charles A. Mellen.
Cridersville	J. M. Woodruff.
*Crooksville	W. J. Brown.
*Croton P. O. (Hartford)	Dr. C. B. Hempstead.
*Crown City	J. V. Stevers.
*Cumberland	Fred W. Lyne.
*Custar	Dr. H. Mannhardt.
*Cuyahoga Falls	William W. Scupholm.
*Cygnet	H. E. Coots.
*Dalton	Dr. J. Coloman Haney.
Danville	Dr. T. E. Jefferson.
Darbyville (Orient R. F. D. 1)	Walter Girton, Williamsport, O.
Dayton	Dr. George Goodhue.
Deavertown	Geo. W. Deaver.
Deerfield (South Lebanon P. O.)	Dr. V. T. Reynolds.
Deersville	W. C. Birney.
Defiance	Dr. J. D. Westrick.
*DeGraff	John W. Hendershott.
Delaware	Dr. D. E. Hughes.
*Delhi	C. B. Davis.
*Dell Roy	Dr. S. B. Lechner.

* In lieu of a board of health.

Place.	Health Officer.
*Delphos	Dr. Norman E. Brundage.
Delta	Geo. A. Everett.
Dennison	Dr. L. H. Hughes.
*Deshler	Isaac Collier.
*Dexter City	G. C. Crosser.
*Dillons P. O. (Cannellville)	Frank W. Dawson.
Dillonvale	John W. Howell.
Donnelsville	Dr. Horace Heistand.
*Doylestown	E. Dannemiller.
Dresden	C. W. Carter.
*Dublin	Newton J. Dominy.
*Dunkirk	Dr. C. C. McLaughlin.
*Dupont	J. A. Myers.
East Cleveland	J. H. Stamberger.
East Fairfield	Dr. G. H. Albright.
East Liverpool	Dr. C. B. Ogden.
East Palestine	Dr. C. E. Johnston.
*East Springfield	Dr. H. L. Fiscus.
*East View (Warrensville P. O.)	Charles C. Murfett.
*Eaton	Geo. W. Jones.
Edgerton	Dr. C. Hathaway.
*Edison	Dr. John H. Jackson.
Edon	Geo. Brady.
Eldorado	Geo. W. McCoy.
Elida	Dr. H. Z. Alexander.
Elgin	Dr. L. P. Jackson.
Elmore	Dr. S. F. Dromgold.
Elmwood Place	Dr. E. T. Busching.
Elyria	Dr. George E. French.
Empire	John Hunter.
Enon	Frank Pappert.
*Euclid	Ernest Earick.
*Eureka P. O. (Chambersburg)	Dr. W. J. Fletcher.
*Fairfield	M. W. Lasure.
Fairmount (Hamlet)	L. Hunter, Clerk.
*Fairport	J. H. Werbeach.
Fairview	C. M. Ault.
*Farmersville	Charles M. Boomershine.
*Fayette	Benjamin Stoner.
*Fayetteville	John Evans.
*Felicity	J. L. Viers.
*Fernbank	James E. Hickman.
Findlay	Amos Beardsley.
Fitchville P. O. (Clinton)	S. M. Sly.
Fletcher	Dr. I. C. Kiser.
Florida	Wm. Thompson.
*Flushing	Ralph James.
Forest	John Handchy.
Fort Jennings	Ferd Heising.
Fort Recovery	Dr. J. M. Buchanan.
Fostoria	W. N. Caldwell.
*Frankfort	John A. Davis.

* In lieu of a board of health.

Place.	Health Officer.
*Franklin	John B. Miller.
*Frazeysburg	G. W. Holtz.
Fredericksburg	Dr. W. H. Merriam.
Fredericktown	Dr. J. H. Norrick.
*Freeport (Harrison Co.)	Wm. McMath.
*Freeport (Prairie Depot) Wood Co.	J. W. Coy.
Fremont	Dr. O. C. Vermilya.
Fultonham P. O. (Uniontown)	Dr. C. Z. Axline.
Gahanna	D. L. Stygler.
Galion	Dr. H. H. Hartman.
Gallipolis	Chas. B. Robinson.
Gambier	Dr. A. D. Welker.
*Gann (Brinkhaven P. O.)	Jacob Fendrich.
*Garrettsville	Dr. Geo. R. French.
Geneva	Dr. F. C. Smith.
*Genoa	Harry Skilliter.
*Georgetown	George Innis.
*Germantown	Benjamin F. Eby.
*Gettysburg	J. L. Nease.
*Geyer	Jas. Killian.
Gibsonburg	J. P. Tierney.
Gilboa	Dr. Bruce Snodgrass.
Girard	Dr. W. S. Thompson.
Glandorf	Dr. Felix C. Harman.
*Glendale	Clifford Allen.
Glenmont	A. L. Jones.
*Glouster	Dr. H. G. Gibson.
*Gnadenhutten	L. S. Winsch.
Good Hope	D. C. Somers.
*Gordon (Hamlet)	Dr. H. Z. Silver.
*Grafton	John Cahill.
Grand Rapids	Wm. E. Kerr.
Grand River P. O. (Richmond)	H. S. Barton.
*Grandview Heights	McKendree Smith.
*Granville	W. E. Clemons.
Gratis P. O. (Winchester, Preble Co.)	Fred Boesenberg.
Graysville	W. E. Barker.
*Green Camp	G. W. Collins.
*Greenfield	Taylor Neff.
Green Spring	Dr. R. D. Reynolds.
Greenville	S. A. Hawes.
Greenwich	F. C. Wood.
*Grove City	William White.
Groveport	Dr. C. R. Clement.
*Grover (Tiltonville P. O.)	Ulysses G. Bennett.
*Grover Hill	G. W. Morris.
Hamden Junction	H. R. Foose.
Hamersville	....
Hamilton	Dr. Mark Millikin.
Hamler	William Fye.
Hanging Rock	Joseph Kinkaid, Sr.
*Hanover	Dr. W. L. Evans.

* In lieu of a board of health.

Place.	Health Officer.
Hanoverton	Newton Steller.
*Harrisburg	Charles Phillips.
Harrison	George Campbell.
Harrisville	W. C. Toland, Mayor.
*Harrod	Chas. R. Boyer.
*Hartford (Croton P. O.)	Dr. C. B. Hempstead.
Hartwell	H. G. Gould.
*Harveysburg	Dr. Samuel Jasper Ellison.
*Haskins	William H. North.
*Haviland	Dr. Myron A. Hanna.
Hayesville	Dill Andress.
*Hebron	Dr. George N. Brown.
Hemlock	Dr. R. W. Miller.
Herring P. O. (Lafayette)	Dr. N. Sager, Jr.
Hicksville	J. W. Conner.
*Higginsport	George Gardner.
Highland P. O. (New Lexington)	
*Hilliards	Dr. C. S. Latham.
Hillsboro	Dr. J. D. McBride.
Hiram	Dr. F. H. Hurd.
*Holgate	Adam Kemmer.
*Hollansburg	Dr. W. B. Roads.
Holloway	J. T. Bendure.
Holmesville	C. W. McClelland.
Home City	Dr. B. F. Lehman.
*Hopedale	Jasper Denning.
*Hoytville	James Nichols.
Hubbard	Dr. W. S. Bond.
Hudson	Dr. H. C. Coolman.
*Huntsville	Dr. G. W. Jones.
*Huron	Robert Day.
*Irondale	Jacob Scharer.
Ironton	Dr. E. E. Wells.
Ithaca	Dr. J. C. Hamilton.
Jackson	Dr. Wm. H. Schellenger.
Jacksonboro	John Stamm.
*Jackson Center	A. A. Davis.
*Jacksonville	Will C. Hilt.
Jamestown	Harry C. Lieurance.
*Jefferson	W. A. Andrews.
*Jeffersonville	Wm. S. Reid.
Jenera	C. H. Heldman.
*Jeromeville	Randolph Winebigler.
Jerry City	Austin Van Blarcum.
Jerusalem	I. B. Carleton.
*Jewett	T. F. Beckett.
Johnsonville	E. C. Hitchcock.
Johnstown	Albert Dresback.
Junction City	Dr. H. W. Shaw.
*Kalida	Dr. W. J. Francis.
Kelleys Island	Geo. P. Schardt.
*Kennedy P. O. (Kennedy Heights)	George Romes.

* In lieu of a board of health.

Place.	Health Officer.
Kent	James Armstrong.
Kenton	John M. Ellis.
*Kettlersville	Dr. O. O. Lemaster.
Killbuck	William C. Stout.
Kimbolton	F. M. Fowler.
Kingston	D. B. Golden.
Kirby	Dr. E. E. Burns.
*Kossuth	William Earhart.
Lafayette (Herring P. O.)	Dr. N. Sager, Jr.
LaGrange	Dr. J. W. Lindsey.
Lakeside	Dr. O. L. Mapes.
Lakeview	E. D. Carr.
Lakewood	Dr. A. E. McClure.
Lancaster	Dr. Geo. W. O'Grady.
*Larue	G. A. L. Markwith.
Latty	Robert Higginbotham.
*Laura	John O. Loury.
Laurelville	Dr. W. D. Cain.
Lebanon	Dr. A. W. Mardis.
*Leesburg (Leesville P. O.)	A. R. Morrison.
*Leesburg (Highland Co.)	Dr. K. R. Teachnor.
*Leesville P. O. (Leesburg, Carroll Co.)	
Leetonia	Dr. S. R. McCready.
Leipsic	Dr. John C. McClung.
Lewisburg	A. N. Cox.
Lewisville	V. E. Dillon.
Lexington	Dr. J. P. Stober.
Liberty Center	D. K. Bowker.
Lima	Dr. A. L. Jones.
*Limaville	T. T. Arnold.
*Lindsey	Dr. Wm. E. Higbie.
*Lisbon	David H. Eells.
*Lithopolis	Dr. J. O. Stout.
*Lockbourne	Dr. M. E. Swinehart.
Lockington	Dr. J. Robt. Caywood, Clerk.
*Lockland	Valentine Harting.
*Lodi	Henry Selders.
*Logan	Dr. Edward E. Campbell.
*London	Dr. John W. Parker.
Lorain	Dr. Edward V. Hug.
*Loramie	Dr. Thomas Walkup.
*Lore City	Nathan Finch.
Loudonville	Walter S. Young.
Louisville	Dr. J. A. Gosling.
Lowell	A. J. Thompson.
*Loveland	Dr. J. D. Wakefield.
*Lowellville	A. E. Schrader.
Lower Salem	J. P. Hartshorn.
*Lucas	Dr. Emil J. Heinig.
*Lynchburg	S. S. Puckett.
*Lyons	Dr. Thos. Blair.
*McArthur	George W. Partlow.

* In lieu of a board of health.

Place.	Health Officer.
McClure	E. E. Britton.
*McComb	James H. Byal.
McConnelsville	William Dille.
Macedonia	P. B. Seacoy.
McGuffey	Dr. J. B. K. Evans.
*Macksburg	W. E. Smithson.
*Madison	Dr. J. V. Winans.
Madisonville	Dr. C. L. Metz.
Magnetic Springs	Dr. M. B. Newhouse.
*Magnolia	Clemons Burwell.
*Maineville	J. G. Trimble.
Malinta	W. M. Hess.
Malta	W. R. Scott.
Malvern	Dr. John A. Rhiel.
Manchester	Dr. R. A. Stephenson.
Mansfield	Dr. M. J. Davis.
Mantua	C. R. Chapin.
Marblehead	L. M. Clemons.
*Marengo	I. E. Eakins.
Marietta	Dr. Clarence R. Sloane.
Marion	Roy Chapman.
*Marseilles	Dr. P. E. Decatur.
*Marshallville	A. F. Ziegler.
*Martinsburg	Dr. N. S. Toland.
Martins Ferry	Dr. J. W. Darrah.
Martinsville	John F. Wells.
*Marysville	Dr. C. W. Hoopes.
Mason	Dr. M. H. Houseworth.
Massillon	Dr. T. Clarke Miller.
*Maumee	Rolla Corbett.
Mechanicsburg	Dr. H. Dickson.
*Medina	E. T. Pierce.
*Melrose	T. J. Myers.
*Mendon	B. T. Price.
*Mentor	Dr. J. W. Lowe.
Metamora	Augustus Reis.
Miamisburg	Dr. William Shuler.
Middleburg	C. C. Heath.
Middlefield	Dr. F. S. Clapp.
Middle Point	J. R. Swaney.
Middleport	Dr. David Sisson.
Middletown	Dr. Geo. D. Lummis.
Midland (Midland City P. O.)	
Midland City P. O.	Dr. Leonidas Boulware.
Midway (Sedalia P. O.)	Dr. E. B. Mead.
*Mifflin	George Fulmer.
*Milan	A. E. Doane.
*Milford	Dr. C. J. Spence.
*Milford Centre	Martin Frye.
Millbury	Dr. C. M. Diebert.
Milledgeville	Dr. W. T. Mathews.
*Miller City	Dr. Lewis E. Deuble.

* In lieu of a board of health.

Place.	Health Officer.
Millersburg	Chas. A. Estill.
Milton Center	Dr. J. F. Noble.
*Miltonsburg	Dr. Chas. R. Keyser.
Mineral City	Dr. F. L. Nape.
Mineral Ridge	Dr. J. M. Elder.
*Minerva	Elmer E. Fultz.
*Mingo Junction	Dr. W. W. McMillan.
*Minster	C. H. Dickman.
*Mogadore	D. J. Robenstine.
Monroe	Jerome Warner.
Monroeville	Dr. E. R. Kreider.
*Montezuma	George Stafford.
Montpelier	Dr. J. V. Lesnet.
*Morristown	A. M. Poole.
*Morrow	Dr. Leonard Mounts.
Moscow	Dr. W. S. Purkhiser.
Mt. Blanchard	Samuel E. Moore.
Mt. Cory	Jacob Doty.
*Mt. Eaton	Dr. C. N. Clark.
*Mt. Gilead	Dr. G. H. Pugh.
*Mt. Healthy	Dr. Lafayette Neufarth.
*Mt. Orab	Dr. C. H. Matthews.
Mt. Pleasant	Henry B. Mercer.
*Mt. Sterling	Dr. Robert Leach.
Mt. Vernon	Dr. H. W. Blair.
Mt. Victory	Dr. B. B. Morrow.
*Mt. Washington	Dr. W. C. Langdon.
Murray City	Dr. T. J. Dillenger.
Mutual	C. M. Goul.
Napoleon	D. H. Hancock.
*Nashville	Dr. A. M. Hoyer.
Navarre	John Bailiss.
Nelsonville	Dr. N. Hill.
*Nevada	Dr. S. S. Barrett.
Neville	F. M. Neal.
New Albany	C. A. Johnson.
*New Alexandria	Dr. C. E. Gourley.
Newark	Dr. W. H. Knauss.
New Athens	Dr. A. B. Tubbs.
*New Bloomington (Agosta P. O.)	Henry E. Snyder.
New Boston	A. W. Snyder.
*New Bremen	Dr. E. M. Phelps.
Newburg	Dr. C. L. McCoy.
Newburg Heights (Willow P. O.)	Dr. W. M. James.
*New Carlisle	D. F. Akers.
Newcomerstown	Wm. Tidrick.
*New Concord	Dr. J. Milton O'Neal.
*New Holland	John Morris.
New Knoxville	Dr. H. E. Fledderjohann.
*New Lebanon (Potsdam P. O.)	Dr. J. W. Shellabarger.
*New Lebanon (Montgomery Co.)	Lutie Piatt.
New Lexington (Highland P. O.)	

* In lieu of a board of health.

Place.	Health Officer.
*New Lexington (Perry Co.)	J. W. Holden.
New London	Wm. H. Whitney.
*New Madison	Dr. E. E. Myers.
*New Matamoras	J. R. Johnston.
*New Paris	Dr. E. E. Bevington.
New Philadelphia	Dr. Geo. H. Peck.
New Richmond	Dr. C. F. Hera.
*New Riegel	Anthony Brickner.
*New Salem	Dr. F. C. Adams.
*New Straitsville	J. B. Winefordner.
*Newton Falls	L. D. Boylan, D. D. S.
*Newtown	Dr. C. R. Campbell.
*New Vienna	Dr. L. W. Trisler.
*New Washington	
*New Waterford	Thomas H. Todd.
*New Weston	Dr. A. Pearson.
*Ney	Dr. P. M. Lehman.
Niles	Dr. H. S. Brown.
*North Amherst	Dr. Washington Foster.
North Baltimore	Dr. William T. Thomas.
*North Bend	William Wiseman.
*North Dover P. O. (Bay)	Geo. L. Osborn.
North Lewisburg	G. L. Freeman.
North Lindale	Hugh Geariety.
*North Robinson	Harry G. Smith.
Norwalk	Lonis Fiesinger.
Norwich	L. D. Wilson.
Norwood	Dr. J. C. Cadwallader.
*Nottingham	Dr. W. O. Jenks.
Oak Harbor	Dr. E. B. Huyck.
*Oak Hill	O. S. Kent.
*Oakley	Dr. H. H. Schulze.
*Oakwood	Martin Shisler.
Oberlin	E. L. Burge.
Ohio City	T. A. Hilleary.
Olmsted Falls	H. B. Northrop.
*Orangeville	Dr. C. S. Fenton.
Orrville	Dr. A. A. Brooks.
*Osborn	H. H. McGill.
Osgood	James Preston.
*Osnaburg	Dr. Aaron Busby.
*Ostrander	M. M. McBride.
Ottawa	Dr. Frank Light.
*Ottoville	Dr. John F. Ockuly.
Otway	Simon Crow.
*Owensville P. O. (Boston)	Edward H. Thirey.
Oxford	Dr. Ralph P. Tate.
Painesville	S. A. Haskell.
*Palestine	W. E. Kester.
*Pandora	Dr. P. D. Bixel.
Pataskala	Frank McConnaughey.
Patterson	Peter C. Breidenbach.

* In lieu of a board of health.

Place.	Health Officer.
Paulding	Dr. E. A. Clark.
*Payne	Dr. G. W. Bodey.
*Peebles	Dr. J. M. Brooke.
Pemberville	Dr. R. J. Simon.
*Peninsula	D. H. Billings.
Perrysburg	Jos. S. Fuller.
Perrysville	D. W. Webster.
Phillipsburg	S. A. Mosby, Secretary.
Philo P. O. (Taylorsville)	Walter Kassell.
*Pickerington	Thomas Tussing.
Piketon	Andrew Martin.
*Pioneer	Arthur F. Norris, V. S.
Piqua	Dr. F. E. Kitzmiller.
*Pitsburg P. O. (Arnettsville)	Dr. J. O. Starr.
*Plain City	J. W. Latham.
*Plainfield	W. H. Bassett.
*Pleasant City	J. W. Trott.
Pleasant Hill	Dr. Judson Teeter.
*Pleasant Ridge	Dr. Geo. O. Sikes.
*Pleasantville	W. I. Winegarner.
Plymouth	Dr. Geo. J. Searle.
Poland	Dr. C. R. Justice.
Polk	Dr. W. H. Rhinehart.
*Pomeroy	Dr. L. G. Gribble.
*Portage	F. W. Munn.
Port Clinton	Dr. David Gillard.
*Port Jefferson	Dr. D. J. Cargill.
Portsmouth	Dr. W. W. Smith.
Port Washington	Dr. F. B. Larimore.
Port Williams (Hamlet)	Dr. Paul D. Espey.
*Potsdam P. O. (New Lebanon)	Dr. D. W. Shellabarger.
Powhatan Point	Franz Saner.
*Prairie Depot P. O. (Freeport)	J. W. Coy.
Proctorville	Dr. R. E. Atkinson.
Prospect	G. F. Gast.
Put-in-Bay	Adam Heidle.
Quaker City	W. W. Dowdell.
*Quincy	Dr. N. V. Speece.
*Racine	Dr. John R. Philson.
*Rarden	W. A. Kates.
Ravenna	Henry J. Shreader.
Rawson	Wm. Hoppas.
Reading	Leo Grau.
*Rendville	Wm. H. Shelton.
*Republic	H. V. Bishop.
*Reynoldsburg	B. F. Oram.
Richmond (Grand River P. O.)	H. S. Barton.
Richmond (Jefferson Co.)	Dr. Samuel Rothacker.
Richwood	J. F. Ledley.
Ridgeway	Dr. S. S. Webster.
*Ripley	Dr. A. W. Francis.
*Rising Sun	N. P. Wirebaugh.

* In lieu of a board of health.

Place.	Health Officer.
*Rochester	D. C. Mann.
*Rock Creek	Jay Gladding.
Rockford	Geo. Kimble.
*Rockport (West Park P. O.)	Dr. Henry C. Kelker.
*Rocky Ridge	John Krehmke.
*Rocky River	Franklin A. Rice.
*Rogers	Wm. Green.
Rome (Stouts (P. O.)	Dr. R. Y. Littleton.
*Roscoe	Samuel T. Dodson.
*Roseville	Harvey Garrett.
*Rossburg P. O. (Rossville)	
*Rossville	C. W. Wheeler.
Rushsylvania	W. H. Drum.
*Rushville	Dr. W. C. Lewis.
Russellville	Dr. A. Gilfillen.
*Sabina	J. H. Burris.
*St. Bernard	Dr. Harry C. Wayble.
*St. Clairsville	Dr. Samuel L. West.
St. Henry	Dr. J. A. Schirack.
St. Louisville	Dr. L. L. Marriott.
St. Marys	Dr. J. E. Heap.
*St. Paris	Dr. H. Rush Zeller.
Salem	Dr. E. J. Schwartz.
*Salesville	Jno. D. McGath.
*Salineville	Dr. H. M. Calvin.
Sandusky	Dr. H. C. Schoepfle.
*Sarahsville	W. F. Danford.
*Sardinia	J. H. Hite.
*Savannah	Simon Stahl.
Scio	Dr. G. D. Custer.
Scott	A. L. Foster.
Sebring	Virgil B. Slater.
Sedalia P. O. (Midway)	Dr. E. B. Mead.
*Senecaville	Richard Lowry.
*Seven Mile	C. B. Wilson.
Seville	Dr. P. E. Beach.
*Shanesville	Charles E. Black.
Sharon	J. A. Reid.
*Shawnee	Michael O'Ferrell.
Shelby	Dr. Roy E. Smucker.
*Sherodsville	Peter Ledger.
Sherwood	Dr. H. C. Lindersmith.
*Shiloh	Dr. N. P. McGay.
*Shreve	John C. Manson.
Sidney	Wm. C. Wyman.
*Silverton	Dr. A. A. Sprague.
*Sinking Spring	Dr. Jas. E. Chapman.
Smithfield	Ross C. Moore.
*Smithville	W. G. Zimmerman.
Somerset	Dr. Michael Clouse.
*Somerville	John B. A. Robertson.
South Bloomfield	

* In lieu of a board of health.

Place.	Health Officer.
South Brooklyn (Brooklyn P. O.).....	R. E. Stickney.
*South Charleston	Albert Reeder.
South Lebanon P. O. (Deerfield)......	Dr. V. T. Reynolds.
*South Point	P. G. Davidson.
*South Salem	H. C. Harper.
South Solon	Dr. W. H. Queen.
*South Webster	S. S. Ferguson.
*South Zanesville	Francis R. Bowers.
Sparta	Dr. T. A. Huggins.
Spencerville	G. A. Rusler.
Springborough	J. B. Haines.
Springfield	Dr. G. E. Kerns.
*Spring Hills	Oliver H. Eby.
*Spring Valley	Dr. J. Alvin Van Winkle.
Stafford	C. G. Robinson.
Steubenville	John Welch.
Stewart	G. H. Hawk.
*Stockport	Dr. T. J. Lyne.
Stouts P. O. (Rome)..................	Dr. R. Y. Littleton.
Strasburg	Dr. J. C. Schutzbach.
*Struthers	Thomas Roberts.
*Stryker	John E. Meek.
Sugar Creek	Mahlon Neff.
*Sugar Grove	Dr. Samuel Renshaw.
Summerfield	John Baughin.
Sunbury	Dr. G. H. Gerhardt.
Swanton	B. F. Mills.
*Sycamore	Dr. Isaiah B. Gibbs.
*Sylvania	A. E. Stow.
*Tarlton	W. A. Leist.
Taylorsville (Philo P. O.)...........	Walter Kassell.
*Thornville	Aldora Yontz.
Thurman P. O. (Centerville)..........	
Tiffin	Dr. H. B. Gibbon.
*Tiltonville P. O. (Grover)..........	Ulysses G. Bennett.
Tippecanoe City	F. N. Agenbroad.
Tiro	Dr. G. O. Blair.
Toledo	Dr. J. C. Reinhart.
*Tontogany	Dr. Thos. A. Bickerstaph.
*Toronto	John Wellington.
Trenton	Henry Fike.
*Trimble	Arthur W. Dean.
Trinway	LeRoy Rose.
*Trotwood	Joseph B. Brandt.
Troy	Dr. J. W. Means.
*Tuscarawas	John Van Lehn.
Uhrichsville	Dr. J. E. Groves.
Union City	Francis Bourguin.
Uniontown (Fultonham P. O.)........	Dr. C. Z. Axline.
*Unionville Center	Dr. C. O. McCune.
Uniopolis	Dr. J. E. Bayliff.
*Upper Sandusky	Dr. Frederick Kenan.

* In lieu of a board of health.

Place.	Health Officer.
Urbana	Dr. H. M. Pearce.
*Utica	D. A. Bricker.
Van Buren	Jas. P. Grubb, Mayor.
*Vandalia	Dr. W. H. Riley.
Vanlue	Dr. Jas. L. Schrote.
Van Wert	Dr. C. G. Church.
Venedocia	Dr. David Davis.
Vermilion	J. M. Delker.
Versailles	Dr. C. F. Ryan.
Vienna (Vienna X Roads P. O.)	Dr. E. A. Dye.
Vienna X Roads P. O.	Dr. E. A. Dye.
*Vinton	Joel A. Pugh.
Wadsworth	Dr. M. F. Miller.
Waldo	Dr. B. D. Osborn.
Wapakoneta	A. Kohler.
Warren	Dr. Geo. N. Simpson.
*Warrensville P. O. (East View)	Charles E. Murfett.
Warsaw	S. W. Willis.
*Washington	S. B. Lawrence.
Washington C. H.	F. M. Bateman.
*Washingtonville	S. V. Kennedy, V. S.
Waterloo (Pancoastburg P. O.)	
Waterville	H. T. Van Fleet.
Wauseon	Earnest Stevens.
Waverly	James J. Emmitt.
Waynesburg	Dr. Gustav A. Shane.
Waynesfield	George Schneider.
Waynesville	Dr. J. T. Ellis.
Webster	J. F. Byrd.
*Wellington	E. D. Snyder, V. S.
Wellston	James R. Ward.
Wellsville	Dr. M. C. Tarr.
*West Alexandria	O. E. Baer.
West Cairo	Dr. Chas. E. Stadler.
*West Carrollton	James Bowles.
West Elkton	Dr. Elwood Holaday.
Western Star	Fred Becker, Wadsworth, R. F. D. 2.
Westerville	P. A. Conklin.
*West Farmington	Albert Ostrom.
West Jefferson	Albert Ayle.
West Lafayette	J. T. Carter.
West Leipsic	Eugene Lamphear.
*West Liberty	Dr. G. B. Hale.
*West Manchester	William E. Emrick.
*West Mansfield	Dr. H. A. Skidmore.
West Mill Grove	Dr. C. B. Hatfield.
*West Milton	Dr. H. R. Pearson.
Weston	Dr. J. W. Williams.
*West Park P. O. (Rockport)	Dr. Henry C. Kelker.
West Rushville	William Kerr.
*West Salem	Dr. E. C. Raudebaugh.

* In lieu of a board of health.

Place.	Health Officer.
West Union	Dr. James W. Bunn.
*West Unity	Joseph Fisher.
Wharton	J. J. Mayer.
*Whitehouse	J. F. Lehman.
Wilkesville	Dr. G. W. Martin.
*Williamsburg	Dr. G. L. Hines.
Williamsport	Dr. D. H. Marcy.
Willoughby	James Maloney.
Willow P. O. (Newburg Heights)	Dr. W. M. James.
*Willshire	Dr. J. F. Shaffner.
Wilmington	Dr. A. T. Quinn.
Wilmot	Dr. O. Curtis Ricksecker.
*Winchester (Adams Co.)	Dr. T. H. Trout.
Winchester (Gratis P. O.) Preble Co.	Fred Boesenberg.
Windham	H. J. Higley.
Woodsfield	John Beard.
Woodstock	D. P. Smith.
Woodville	Dr. R. M. Durbin.
Wooster	Dr. J. W. Lehr.
*Worthington	Charles Michael.
Wren	
Wyoming	Dr. Paul Gillespie.
Xenia	Dr. L. H. Brundage.
Yellow Springs	William Loe.
*Yorkshire	A. E. Putterbaugh.
Youngstown	Dr. H. E. Welch.
Zaleski	J. W. Crist, Mayor.
*Zanesfield	Dr. O. H. McDonald.
Zanesville	Dr. G. W. McCormick.
*Zoar	Christian Ruof.

* In lieu of a board of health.

HEALTH OFFICERS APPOINTED BY COUNCIL TO SERVE IN LIEU OF A BOARD OF HEALTH, AND APPROVED BY THE STATE BOARD OF HEALTH, UNDER SECTION 187 OF THE MUNICIPAL CODE.

Village.	Name.	Appointed.	Approved.	Term Expires 2d Monday in January.
Adamsville	H. E. Darner	1- 7-08	2- 5-08	1909
Addyston	Dr. J. H. Haire	1-28-08	2- 3-08	1910
Agosta P. O. (See New Bloomington)	....	....	....	....
Alexandria	Elim M. Shaub	3- 2-08	3-12-08	1909
Amelia	Dr. Homer C. Behymer	2- 7-08	2-25-08	1909
Anna	Dr. D. R. Milliette	1-13-08	1-22-08	1909
Ansonia	Dr. J. C. Poling	1-13-08	1-22-08	1909
Antioch	Dr. D. W. Lowe	1-18-06	1-31-06	1908
Antwerp	Andrew J. Schilb	1- 7-08	1-22-08	1909
Apple Creek	Alvin A. Reinhardt, V. S.	1-20-08	2-11-08	1909
Arcadia	W. W. Moore	2- 3-08	2-11-08	1910
Arlington Heights	Jess R. Miller	1- 7-08	2- 5-08	1909
Ashland	E. A. Kauffman	1-20-08	1-22-08	1910
Ashley	James Hall	1- 6-08	1-29-08	1909
Athalia	S. X. McCown	9-24-07	11- 8-07	1908
Attica	Dr. C. A. Force	1- 1-08	2-13-08	1909
Bainbridge	Dr. J. H. Pake	1- 1-08	1-22-08	1909
Bairdstown	D. M. Cassner	1-15-08	1-22-08	1910
Barberton	Dr. Geo. A. Brown	1-13-08	1-22-08	1910
Bay (North Dover P. O.)	Geo. L. Osborn	2- 3-08	2-11-08	1909
Beaver	Dr. A. L. McAllister	2- 4-07	3-28-07	1909
Belle Valley	Dr. Frank R. Dew	1-20-08	2- 5-08	1909
Bergholz	Thomas McConaughy.	11- 7-07	12-13-07	1909
Berlin X Roads	Henry Davis	3-16-07	3-26-07	1909
Berlin Heights	Dr. Geo. Whitney Hine	2- 7-07	3-11 07	1908
Berne P. O. (See Carlisle)	....	....	....	....
Bethel	Dr. W. E. Thompson.	1-13-08	1 22-08	1910
Bettsville	C. G. Norton	1-24-08	1-29-08	1909
Blakeslee	James B. Lauchlen	1-12-07	1-17-07	1908
Blanchester	U. B. Chambers	2- 4-07	2- 6-07	1909
Bloomdale	G. W. Urie	9-20-04	10- 7-04	1910
Bloomingburg	H. W. Worrell	1-20-08	1-22-08	1909
Bolivar	William E. Lash	1- 6-08	2-15-08	1909
Boston (Owensville P. O.)	Edward H. Thirey	1-17-08	1-22-08	1909
Botkins	Dr. G. A. Biebesheimer	1-14-08	1-22-08	1909
Bowerston	H. Karn	1- 7-07	1-15-07	1909
Bowersville	J. E. Steward	1- 9-08	1-22-08	1910
Bradford	B. H. Sothoron	1- 1-08	1-22-08	1910
Bradner	Amos Chronister	1-24-07	3-20-07	1909

HEALTH OFFICERS APPOINTED BY COUNCIL — Continued.

Village.	Name.	Appointed.	Approved.	Term Expires 2d Monday in January.
Bratnahl	J. G. Newkirk	1- 6-05	2- 2-05	1907
Bremen	T. L. Householder	1-17-08	1-22-08	1909
Bridgeport	Oliver Porter	1- 7-08	1-22-08	1909
Brink Haven (Gann P. O.)	Jacob Fendrick	2-29-08	3-28-08	1910
Brooklyn Heights	Jos. E. Richardson	2- 4-08	2-10-08	1909
Broughton	James Boroff	1-15-08	1-22-08	1910
Buchtel	Ralph Ball	2- 3-08	2- 6-08	1910
Burbank	A. W. Hoffman	2- 4-08	2-15-08	1910
Butler	D. J. McCready	1-13-08	1-22-08	1909
Butlerville	Elias Smith	2- 4-07	2-23-07	1908
Byesville	J. R. Hildebrand	1-17-08	2-21-08	1909
Cadiz	Dr. W. H. Lemmon	1- 1-08	1-22-08	1909
Calais	Dr. J. R. Johnson	....	....	....
Caldwell	Dr. J. L. Gray	3-21-08	3-24-08	1909
Camden	Dr. Geo. W. Homsher	1- 2-08	1-22-08	1909
*Canal Dover P. O. (See Dover)	....	11- 4-07	....	1909
Canal Winchester	Dr. John W. Shook	1-13-08	1-22-08	1910
Cannelsville (Dillon's P. O.)	Frank W. Dawson	3-26-08	4-10-08	1910
Cardington	C. F. Axthelm	2- 3-08	2- 5-08	1910
Carey	Joseph F. Wonder	1-13-08	1-22-08	1910
Carlisle (Berne P. O.)	W. R. Bromhall	2- 3-08	3-11-08	1909
Carthage	Dr. Odus D. Simmons	3-17-08	4-10-08	1909
Casstown	Dr. W. W. Baker	1-31-08	2- 5-08	1910
Cecil	Dr. F. W. McNamara	1- 6-08	3-24-08	1909
Centerville	Dr. B. W. Dudley Keever	1-13-08	1-28-08	1909
Chagrin Falls	D. A. Groves	1- 2-08	1-22-08	1910
Chambersburg (Eureka P. O.)	Dr. W. J. Fletcher	1-13-08	1-22-08	1910
Chardon	John Binley Grimm	3- 5-08	3-24-08	1909
Chatfield	Samuel Lutz	1- 3-08	1-22-08	1909
Chesterhill	William Johnson	3- 2-08	3-28-08	1909
Chesterville	Dr. J. D. Varney	2- 5-08	2-25-08	1910
Cheviot	Charles Craig	1-15-08	1-22-08	1909
Chickasaw	John P. Stroeger	2- 4-08	2-21-08	1910
Clarksburg	Tilden Morris	2- 4-08	2-21-08	1909
Clarksville	Perry Wilson	2- 6-08	2-13-08	1909
Cleveland Heights	Lorenzo Brockway	4- 2-07	4-23-07	1908
Cleves	Dr. Wm. C. Hughes	1-20-08	2- 5-08	1909
Clifton	Dr. David E. Spahr	1-14-08	1-28-08	1909
Cloverdale	Dr. J. E. Stephan	2- 4-08	2- 8-08	1909
Coal Grove	Dr. M. C. Ramey	1- 1-08	2-21-08	1909
Coalton	J. C. Duncan	1-20-08	1-28-08	1910
College Corner	George Bargett	2- 3-08	2-15-08	1910
Collinwood	Dr. Jerome D. Dodge	1-13-08	2-15-08	1909
Columbus Grove	Dr. N. Seaman	1-20-08	2-10-08	1909
Commercial Point	Leslie Harlor	2-17-08	2-25-08	....

* Appointed by State Board of Health.

HEALTH OFFICERS APPOINTED BY COUNCIL — Continued.

Village.	Name.	Appointed.	Approved.	Term Expires 2d Monday in January.
Continental	C. Corbitt	4– 2–08	1–10–08	1910
Corning	William Anderson	1– 6–08	1–22–08	1909
Corwin	Jacob I. Clark	1–31–06	2–10–06	1909
Creston	C. A. Mellen	1–20–08	1–28–08	1910
Crooksville	W. J. Brown	1–20–08	1–22–08	1909
Croton P. O. (See Hartford)	....	....	....	....
Crown City	James V. Stevers	1–11–08	1–28–08	1910
Cumberland	Fred W. Lyne	2–11–08	2–21–08	1909
Custar	Dr. H. Mannhardt	1– 6–08	2–21–08	1910
Cuyahoga Falls	William W. Scupholm	1– 2–08	1–22–08	1910
Cygnet	H. E. Coots	2– 4–08	2–15–08	1909
Dalton	Dr. J. Coleman Haney	1–10–08	3– 4–08	1910
De Graff	J. W. Hendershott	1– 1–08	1–22–08	1909
Delhi	C. B. Davis	8–28–06	9–22–06	1909
Dell Roy	Dr. S. B. Lechner	1–20–08	2– 5–08	1909
Delphos	Dr. Norman E. Brundage	1–14–08	1–22–08	1909
Deshler	Isaac Collier	1–18–07	1–29–07	1908
Dexter City	G. W. Crosser	1–11–08	1–29–08	1909
Dillon P. O. (See Cannelsville)	....	....	....	....
Dillonvale	John W. Howell	4– 6–08	4–17–08	1910
Doylestown	Edward Dannemiller	1–28–08	2– 5–08	1909
Dover (Canal Dover P. O.)	H. H. Prince	11– 4–07	....	1909
Dublin	Newton J. Dominy	2–25–07	3– 5–07	1908
Dunkirk	Dr. C. C. McLaughlin	1–20–08	1–22–08	1909
Dupont	J. A. Myers	1–13–08	1–22–08	1910
East Springfield	Dr. Harry L. Fiscus	9–12–04	9–13–04	1908
East View (Warrensville, P. O.)	Charles C. Murfett	11–11–07	12–31–07	1909
Eaton	Geo. W. Jones	1– 8–06	1–17–06	1908
Edison	Dr. John H. Jackson	9–21–05	10–16–05	1909
Euclid	Ernest Earick	1–13–08	1–22–08	1909
Eureka P. O. (See Chambersburg)	....	....	....	....
Fairfield	M. W. Lasure	1– 1–08	1–22–08	1909
Fairport Harbor	J. H. Werbeach	1–29–07	2– 5–07	1909
Farmersville	Charles M. Boomershine	2– 5–08	2–21–08	1909
Fayette	Benjamin Stoner	1– 8–08	1–28–08	1910
Fayetteville	John Evans	2– 1–08	2–15–08	1910
Felicity	J. L. Viers	2–15–08	3– 2–08	1910
Fern Bank	James E. Hickman	5– 3–03	3–11–05	1909
Flushing	Ralph James	1– 6–08	2– 5–08	1910
Frankfort	John A. Davis	1–13–08	1–22–08	1909
Franklin	John B. Miller	2– 3–08	2– 6–08	1910
Frazeysburg	G. W. Holtz	1–27–08	1–28–08	1909
Freeport, Harrison Co.	Wm. McMath	1–13–08	1–22–08	1909
Freeport (Prairie Depot P. O.)	J. W. Coy	1–20–08	1–22–08	1909

HEALTH OFFICERS APPOINTED BY COUNCIL — Continued.

Village.	Name.	Appointed.	Approved.	Term Expires 2d Monday in January.
Gann (See Brinkhaven).	....	....	....	....
Garrettsville	Dr. Geo. R. French	1- 1-08	1-22-08	1909
Genoa	Harry Skilliter	1-14-08	1-22-08	1909
Georgetown	George Innis	1-14-08	1-22-08	1909
Germantown	Benjamin F. Eby	2-24-08	3- 6-08	1909
Gettysburg	John L. Nease	2- 3-08	2-15-08	1909
Geyer	....	....	....	....
Glendale	Clifford Allen	1- 6-08	2- 8-08	1909
Gnadenhutten	L. S. Winsch	2-17-08	2-25-08	1910
Gordon	Dr. H. Z. Silver	1-20-08	1-22-08	1909
Grafton	John Cahill	1-13-08	1-22-08	1909
Grandview Heights	Dr. McKendree Smith	1-28-07	3- 8-07	1908
Granville	W. E. Clemons, V. S.	1- 7-08	1-22-08	1909
Green Camp	G. W. Collins	3- 2-08	3-11-08	1910
Greenfield	Taylor Neff	1-20-08	1-22-08	1909
Greenwich	F. C. Wood	1-17-08	3-12-08	1909
Grove City	William White	1-13-08	1-22-08	1909
Grover (Tiltonsville P. O).	Ulysses G. Bennett	1-21-08	1-22-08	1910
Grover Hill	G. W. Morris	3-11-07	3-11-07	1908
Hanover	Dr. W. L. Evans	1- 5-08	2- 5-08	1909
Harrisburg	Charles Phillips	1- 6-08	1-22-08	1909
Harrod	Chas. R. Boyer	1-15-08	2-10-08	1909
Hartford (Croton P. O.)	Dr. C. B. Hempsted.	2- 4-08	2-18-08	1909
Harveysburg	Dr. Samuel J. Ellison	1-13-08	1-28-08	1909
Haskins	William H. North	1- 6-08	1-22-08	1909
Haviland	Dr. Myron A. Hanna	1-13-08	1-22-08	1909
Hebron	Dr. Geo. N. Brown	2- 4-07	2-12-07	1909
Higginsport	George Gardner	1- 6-08	1-22-08	1909
Hilliards	Dr. Clarence S. Latham	11-20-05	3- 9-06	1908
Holgate	Adam Kemmer	1- -08	1-29-08	1909
Hollansburg	Dr. W. B. Roads	2-17-08	3-12-08	1910
Hopedale	Jasper Denning	2- 7-08	2-15-08	1909
Hoytville	James Nichols	1- 6-08	3- 2-08	1910
Huntsville	Dr. G. W. Jones	1-13-08	1-22-08	1909
Huron	Robert Day	1- 8-08	1-28-08	1909
Irondale	Jacob Scharer	2- 6-08	3-12-08	1909
Jackson Center	A. A. Davis	1- 6-08	1-22-08	1910
Jacksonville	Will C. Hilt	2-12-08	4-10-08	1909
Jefferson	W. S. Andrews	1- 7-07	3-14-07	1908
Jeffersonville	William S. Reid	2- 4-08	2- 8-08	1909
Jeromeville	Randolph Winbigler	2- 3-08	2-10-08	1909
Jewett	T. F. Beckett	1- 2-07	1- 9-07	1909
Kalida	Dr. W. J. Francis	2- 3-08	2-10-08	1909
Kennedy Heights	George Romes	1- 4-08	1-22-08	1909
Kettlersville	Dr. O. O. LeMaster.	1- 6-08	1-22-08	1909
Kossuth	William Earhart	2- 2-06	2-23-06	1908
Lakeside	Dr. O. L. Mapes	7- 5-04	7-13-04	....
Lakeview	E. D. Carr	1-24-08	3- 4-08	1909
Laura	G. L. Markwith	2- 4-07	2- 8-07	1909
Larue	John O. Loury	1-15-08	1-22-08	1909

HEALTH OFFICERS APPOINTED BY COUNCIL — Continued.

Village.	Name.	Appointed.	Approved.	Term Expires 2d Monday in January.
Leesburg (Leesville P. O.)	A. R. Morrison	1- 6-08	1-22-08	1909
Leesburg, Highland Co.	Dr. K. R. Teachnor.	1- 7-08	1-22-08	1910
Lexington	Dr. J. P. Stober	2- 3-08	2- 5-08	1909
Limaville	T. T. Arnold	1- 3-07	1-18-07	1908
Lindsey	Dr. W. E. Higbie	1-20-08	1-28-08	1909
Lisbon	David H. Eells	2- 3-08	2- 6-08	1909
Lithopolis	Dr. J. O. Stout	1-14-07	2- 4-07	1908
Lockbourne	Dr. M. E. Swinehart	1- 7-08	1-22-08	1909
Lockland	Valentine Harting	1- 1-08	1-22-08	1910
Lodi	Henry Selders	1- 6-08	1-22-08	1909
Logan	Dr. Edward E. Campbell	1- 6-08	1-22-08	1909
London	Dr. John W. Parker.	1-17-08	1-29-08	1910
Loramie	Dr. Thomas Walkup.	1-13-08	1-22-08	1909
Lore City	Nathan Finch	3- 2-08	3-24-08	1909
Loveland	Dr. J. D. Wakefield	1-13-08	1-22-08	1910
Lowellville	A. E. Schrader	3-17-08	4-10-08	1910
Lucas	Dr. Emil J. Heinig	1- 3-08	1-28-08	1909
Lynchburg	S. S. Puckett	4- 6-08	4-17-08	1910
Lyons	Dr. Thomas Blair	1- 6-08	1-22-08	1910
McArthur	Geo. W. Partlow	2- 4-08	2-10-08	1909
McComb	James H. Byal	1-20-08	1-30-08	1909
Macksburg	W. E. Smithson	1- 6-08	1-22-08	1910
Madison	Dr. J. V. Winans	1- 7-08	1-22-08	1909
Magnolia	Clemens Burwell	10- 7-07	11-16-07	1909
Maineville	Joseph G. Trimble	2- 3-08	2-18-08	1909
Marengo	I. E. Eakins	2- 4-07	2- 6-07	1909
Marseilles	Dr. P. E. Decatur	2- 3-08	2-15-08	1909
Marshallville	A. F. Ziegler	1-25-08	2-10-08	1909
Martinsburg	Dr. N. S. Toland	2-20-05	3-15-05	1908
Marysville	Dr. C. W. Hoopes	1- 9-08	1-22-08	1910
Maumee	Rolla Corbett	1-20-08	1-22-08	1909
Medina	E. T. Pierce	1-14-08	1-30-08	1909
Melrose	Thos. J. Meyers	1-17-07	4-18-07	1908
Mendon	B. T. Price	1-27-08	2-15-08	1910
Mentor	Dr. J. W. Lowe	1- 4-08	2-10-08	1909
Mifflin	George Fulmer	1- 3-08	1-22-08	1910
Milan	A. E. Doane	1-27-08	2- 5-08	1909
Milford	Dr. C. L. Spence	1-21-08	2- 5-08	1910
Milford Center	Martin Frye	1-13-06	5- 8-06	1908
*Miller City	Dr. Lewis E. Double.	1-22-08	....	1909
Miltonsburg	Dr. C. R. Kaysor	2- 3-08	2- 6-08	1909
Minerva	Elmer E. Fultz	1-14-08	1-22-08	1910
Mingo Junction	Dr. W. W. McMillan	1-23-07	2- 8-07	1908
Minster	C. H. Dickman	1-12-06	1-24-06	1907
Mogadore	Harry Darrah	1- 6-08	1-29-08	1910
Monroe	Jerome Warner	3- 2-08	3-12-08	1910
Montezuma	Geo. Stafford	1-23-08	1-28-08	1909

* Appointed by State Board of Health.

HEALTH OFFICERS APPOINTED BY COUNCIL — Continued.

Village.	Name.	Appointed.	Approved.	Term Expires 2d Monday in January.
Morristown	A. M. Poole	1-16-08	1-22-08	1910
Morrow	Dr. Leonard Mounts.	1-24-07	2-12-07	1909
*Mt. Eaton	Dr. C. N. Clark	11- 1-06	....	1909
Mt. Gilead	Dr. George H. Pugh.	1-10-08	1-22-08	1909
Mt. Healthy	Dr. Lafayette Neufarth	1-21-08	2-18-08	1909
Mt. Orab	Dr. C. H. Matthews..	3- 2-08	3-11-08	1909
Mt. Sterling	Dr. Robert Leach	1- 3-08	1-22-08	1909
Mt. Washington	Dr. W. C. Langdon..	1- 7-08	1-28-08	1909
Nashville	Dr. A. M. Hoyer	1-13-08	4-10-08	1909
Nevada	Dr. S. S. Barrett	1-14-07	2- 4-07	1909
New Alexandria	Dr. C. E. Gourley	3-26-06	4- 5-06	1912
New Bloomington (Agosta P. O.)	Harry E. Snyder	1- 6-08	1-22-08	1910
New Bremen	Dr. E. M. Phelps	1-13-08	1-22-08	1909
New Carlisle	D. F. Akers	1- 6-08	1-22-08	1909
New Concord	Dr. J. Milton O'Neal	1-17-08	....	1909
New Holland	John Morris	1-14-08	1-22-08	1910
New Lebanon (Potsdam P. O.)	Dr. D. W. Shellabarger	2- 3-08	2- 6-08	1909
New Lebanon (Montgomery Co.)	Lutie Piatt	1- 7-08	1-22-08	1909
New Lexington	John W. Holden	1-13-08	1-22-08	1909
New Madison	Dr. E. E. Myers	1-13-08	1-22-08	1910
New Matamoras	J. R. Johnston	1-20-08	1-28-08	1909
New Paris	Dr. E. E. Bevington.	1- 6-08	2- 5-08	1910
New Riegel	Anthony Brickner ..	1-20-08	1-22-08	1909
New Salem	Dr. Frank C. Adams	1- 6-08	1-22-08	1909
New Straitsville	J. B. Winefordner	1- 6-08	1-22-08	1909
Newton Falls	L. D. Boylan, D. D. S.	2- 7-08	3-28-08	1909
Newtown	Dr. C. R. Campbell	2-22-08	3- 6-08	1909
New Vienna	Dr. L. W. Trisler	1-13-08	1-22-08	1909
New Washington	....	....	....	....
New Waterford	Thomas H. Todd	1-20-08	2- 3-08	1909
New Weston	Dr. A. Pearson	1-21-08	2-10-08	1909
Ney	Dr. P. M. Lehman	1-13-08	1-22-08	1910
North Amherst	Dr. Washington Foster	1-23-08	1-28-08	1909
North Bend	Wm. Wiesman	1-13-08	1-22-08	1910
*North Dover P. O. (See Bay)	....	....	....	....
North Robinson	Harry G. Smith	1- 6-08	1-22-08	1910
Nottingham	Dr. Wm. O. Jenks..	1-20-08	2- 6-08	1909
Oak Hill	O. S. Kent	2-26-08	3- 6-08	1909
Oakley	Dr. H. H. Schulze	1- 7-08	2-10-08	1909
Oakwood	Martin Shisler	2- 4-08	2- 8-08	1909
Orangeville	Dr. C. S. Fenton	1-23-08	2- 5-08	1910
Osborn	H. H. McGill	1- 2-08	1-29-08	1909
Osnaburg	Dr. Aaron Busby	1-29-08	2- 3-08	1909

* Appointed by State Board of Health.

HEALTH OFFICERS APPOINTED BY COUNCIL — Continued.

Village.	Name.	Appointed.	Approved.	Term Expires 2d Monday in January.
Ostrander	M. M. McBride	1- 6-08	1-22-08	1909
Ottoville	Dr. Jno. F. Ockuly	1- 7-08	1-22-08	1909
Owensville P. O. (See Boston)	....	....	....	....
Palestine	W. E. Kester	1-13-08	1-22-08	1910
Pandora	Dr. P. D. Bixel	3- 2-08	3-12-08	1910
Payne	Dr. G. W. Bodey	1-20-08	2-10-08	1910
Peebles	Dr. J. M. Brooks	1- 6-08	2-15-08	1909
Peninsula	D. H. Billings	12-19-06	3- 8-07	1908
Pickerington	Thomas Tussing	1-13-08	1-22-08	1909
Pioneer	Arthur F. Norris V. S.	1- -08	2-13-08	1909
Plain City	J. W. Latham	2- 3-08	2-21-08	1909
Plainfield	W. H. Bassett	1- 6-08	1-22-08	1910
Pleasant City	J. W. Trott	2- 3-08	2-10-08	1909
Pleasant Ridge	Dr. Geo. O. Sikes	1-14-08	1-22-08	1910
Pleasantville	W. I. Winegarner	1-20-08	2-10-08	1909
Pomeroy	Dr. L. G. Gribble	1-15-08	2- 8-08	1909
Portage	F. M. Munn	1-14-08	1-22-08	1909
Port Jefferson	Dr. D. J. Cargill	2- 4-07	3- 8-07	1909
Port William	Dr. Paul D. Espey	2- 3-08	3-28-08	1909
Potsdam P. O. (See New Lebanon)	....	....	....	....
Prairie Depot P. O. (See Freeport)	....	....	....	....
Quincy	Dr. N. V. Speece	1-14-08	1-22-08	1909
Racine	Dr. John R. Philson.	1-13-08	2- 5-08	1910
Rarden	W. A. Kates	1- 6-08	1-22-08	1910
Rendville	William H. Shelton	1- 7-08	1-22-08	1909
Republic	H. V. Bishop	5- 3-07	5-28-07	1909
Reynoldsburg	B. F. Orem	1- 1-08	2- 6-08	1909
Ripley	Dr. A. W. Francis	1-16-08	2-10-08	1909
Rising Sun	N. P. Wirebaugh	1- 7-08	1-22-08	1909
Rochester	D. C. Mann	3- 2-08	3-24-08	1910
Rock Creek	Jay Gladding	1-14-08	1-22-08	1909
Rockport (West Park P. O.)	Dr. Henry C. Kelker	2-18-08	3- 2-08	1909
Rocky Ridge	John Krehmke	1-13-08	1-22-08	1910
Rocky River	Franklin A. Rice	1-17-08	2-21-08	1909
Rogers	Wm. Green	1-13-08	1-29-08	1910
Roscoe	Samuel T. Dobson	1-21-08	1-22-08	1910
Roseville	Harvey Garrett	1- 6-08	1-22-08	1909
Rossville (Rossburg P. O.)	C. W. Wheeler	1-17-08	1-22-08	1910
Rushville	Dr. W. C. Lewis	1- 6-08	1-22-08	1910
Sabina	J. H. Burris	1- 6-08	1-22-08	1909
St. Bernard	Dr. Harry C. [illegible]	1-2[illegible]-08	1-29-08	1909
St. Clairsville	Dr. Samuel L. West.	1- 6-08	2-11-08	1910
St. Paris	Dr. H. Rush Zeller	1- 8-08	1-22-08	1909
Salesville	Jno. D. McGath	1-17-07	3- 8-07	1909
Salineville	Dr. H. M. [illegible]	1- 9-08	1-28-08	1909
Sarahsville	W. F. Danford	2- 3-08	3- 2-08	1909

HEALTH OFFICERS APPOINTED BY COUNCIL — Continued.

Village.	Name.	Appointed.	Approved.	Term Expires 2d Monday in January.
Sardinia	J. H. Hite	1-24-08	3-24-08	1909
Savannah	Simon Stahl	2- 3-08	2-15-08	1910
Senecaville	Richard Lowry	1-13-08	1-22-08	1910
Seven Mile	C. B. Wilson	1- 7-07	2- 5-07	1908
Shanesville	Chas. E. Black	1-10-08	2- 5-08	1909
Shawnee	Dr. Michael O'Farrell	1-21-08	1-22-08	1910
Sherodsville	Peter Ledger	1-16-08	1-22-08	1910
Shiloh	Dr. N. P. McGay	2- 3-08	2-18-08	1909
Shreve	John C. Manson	1- 6-08	1-22-08	1909
Silverton	Dr. A. A. Sprague	1- 2-08	1-22-08	1909
Sinking Springs	Dr. James E. Chapman	1-13-08	1-22-08	1910
Smithville	W. G. Zimmerman	1-28-07	2-23-07	1909
Somerville	John B. A. Robertson	1-21-08	1-28-08	1909
South Charleston	Albert Reeder	1-21-08	1-29-08	1909
South Point	P. G. Davidson	12-26-07	1-22-08	1909
South Salem	H. C. Harper	1-14-08	1-22-08	1910
South Webster	S. S. Ferguson	1- 6-08	1-22-08	1909
South Zanesville	Francis R. Bowers	1-20-08	1-29-08	1909
Spring Hills	Dr. G. E. Kerns	2- 8-08	4-17-08	1909
Spring Valley	Dr. J. Alvin Van Winkle	1- 6-08	1-22-08	1909
Stafford	C. G. Robinson	3-25-08	4-17-08	1909
Stcokport	Dr. T. J. Lyne	2- 3-08	2-10-08	1909
Struthers	Thomas Roberts	1- 8-08	2- 5-08	1909
Stryker	John E. Meek	7-31-05	10-16-05	1909
Sugar Grove	Dr. Samuel Renshaw	1-20-08	1-22-08	1909
Sycamore	Dr. I. B. Gibbs	1-13-08	2-10-08	1910
Sylvania	A. E. Stow	1-17-08	1-29-08	1909
Tarlton	W. A. Leist	1-25-07	2- 5-07	1909
Thornville	Aldora Yontz	1-20-08	1-29-08	1909
Tiltonsville P. O. (Grover)	....	....	....	....
Tontogany	Dr. Thos. A. Bickerstaph	1-14-07	3-14-07	1909
Toronto	John Wellington	1-10-08	1-22-08	1910
Trimble	Arthur W. Dean	1-15-07	1-17-07	1908
Trotwood	Jos. B. Brandt	1-23-08	2-13-08	1910
Tuscarawas	John Van Lehn	1-31-08	2-15-08	1910
Unionville Center	Dr. C. O. McCune	2-11-07	2-26-07	1909
Upper Sandusky	Dr. Fredrick Kenan	2- 3-08	2-10-08	1909
Utica	D. A. Bricker	4- 8-07	4-23-07	1908
Vandalia	Dr. W. H. Riley	1-15-06	2- 8-06	1907
Vinton	Joel A. Pugh	11- 5-07	1-22-08	1909
Washington	S. B. Lawrence	5- 7-06	6- 2-06	1908
Washingtonville	S. V. Kennedy, V. S.	1-21-08	1-28-08	1909
Waverly	James J. Emmitt	4- 1-08	4-17-08	1910
Wellington	E. D. Snyder, V. S.	1-20-08	1-22-08	1910
Wauseon	Earnest Stevens	1-20-08	3-12-08	1909
West Alexandria	O. E. Baer	1-20-08	1-29-08	1910

HEALTH OFFICERS APPOINTED BY COUNCIL — Concluded.

Village.	Name.	Appointed.	Approved.	Term Expires 2d Monday in January.
West Carrollton	James Bowles	1-14-08	2- 5-08	1909
West Farmington	Albert Ostrom	11- 5-07	11-18-07	1909
West Liberty	Dr. G. B. Hale......	1-17-08	1-22-08	1909
West Manchester	William E. Emrick...	1-20-08	1-22-08	1910
West Mansfield	Dr. H. A. Skidmore.	2-17-08	2-21-08	1909
West Milton	Dr. H. R. Pearson..	1-20-08	1-29-08	1909
West Salem	Dr. E. C. Raudebaugh	1-17-08	1-22-08	1909
West Unity	Joseph Fisher	1-20-08	2- 3-08	1910
Whitehouse	J. F. Lehman........	1- 4-08	1-22-08	1910
Williamsburg	Dr. G. L. Hines.....	1-14-07	3- 8-07	1909
Willshire	Dr. J. F. Shaffner...	1- 9-08	1-22-08	1909
Winchester	Dr. T. H. Troute....	2- 3-08	3-24-08	1909
Worthington	Charles Michael	1-14-08	1-22-08	1910
Yorkshire	A. E. Putterbaugh...	1-20-08	1-22-08	1909
Zanesfield	Dr. O. H. McDonald.	1- 6-08	1-22-08	1909
Zoar	Christian Ruof	1- 6-08	1-22-08	1909

Abstracts of Reports

OF

DEATHS AND THEIR CAUSES

DURING 1907.

ABSTRACTS OF REPORTS OF DEATHS AND THEIR CAUSES, DURING 1907.

Cities.	*Estimated Population.	Total Deaths.	Annual Rate per 1000.	Age.		General Diseases.									
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.	Purulent and Septicemic Infections.
Akron	60,000	648	10.80	....	....	17	....	..	....	1	1	7	4	....	10
Alliance	15,000	166	11.07	10	10	5	....	..	....	....	....	3	....	....	11
Ashtabula	18,000	302	16.78	58	23	6	....	..	....	....	1	7	2	....	4
Bellaire	15,000	214	14.27	50	27	4	....	..	1	1	3	4	4	1	11
Bellefontaine	....	‡....	....	....	....	....	....	..	....	....	....	....	....	....	....
Bowling Green	5,000	51	10.20	....	....	3	....	..	....	....	....	....	....	....	....
Bucyrus	9,000	81	9.00	9	4	2	....	..	....	....	1	....	....	....	1
Cambridge	15,000	177	11.80	29	18	8	....	..	2	....	1	1	1	1	10
Canal Dover	7,000	78	11.14	....	....	2	3	..	1	2	1	1	1	....	3
Canton	45,000	477	10.60	36	27	20	....	..	....	8	....	7	4	....	4
Chillicothe	....	‡....	....	....	....	....	....	..	....	....	....	....	....	....	....
Cincinnati	380,000	6,405	16.85	918	367	157	2	..	19	5	15	56	48	30	7
Circleville	7,000	124	17.71	18	10	....	....	..	....	....	1	4	3	1	3
Cleveland	500,000	7,678	15.36	1,998	632	84	1	..	35	121	36	97	69	13	66
Columbus	185,000	2,117†	11.44	*335	92	48	....	..	1	2	15	13	18	10	24
Conneaut	7,200	102	14.17	21	6	8	....	..	....	....	....	....	1	....	2
Coshocton	10,000	121	12.10	19	6	8	....	..	....	1	1	....	....	3	....
Dayton	125,000	1,815	14.52	287	104	29	2	..	....	4	2	22	6	4	....
Defiance	9,000	95	10.56	9	5	2	....	..	....	....	....	1	....	....	....
Delaware	10,000	133	13.30	2	10	6	....	..	....	....	....	2	....	2	....
East Liverpool	20,000	371	18.55	....	....	18	....	..	....	2	2	7	4	....	2
Elyria	15,000	157	10.47	6	10	2	....	..	....	....	1	....	....	....	2
Findlay	18,000	208	11.56	23	7	5	....	..	....	1	....	3	....	3	....
Fostoria	11,000	106	9.64	10	11	2	....	..	....	....	....	5	....	1	2
Fremont	10,000	108	10.80	2	10	5	....	..	1	1	2	1	2	....	2
Galion	8,500	93	10.94	8	4	4	....	..	....	....	1	....	1	....	....
Gallipolis	5,000	133	26.60	4	1	2	....	..	....	....	....	3	....	....	5
Greenville	7,000	67	9.57	9	6	3	....	..	2	....	....	....	1	....	1
Hamilton	35,000	431	12.31	....	....	9	....	..	1	2	....	3	....	....	3
Ironton	15,000	234	15.60	50	12	13	....	..	....	....	5	1	....	6	....
Kenton	....	‡....	....	....	....	....	....	..	....	....	....	....	....	....	....
Lancaster	16,280	182	11.18	11	15	17	1	..	....	....	1	1	4	....	3
Lima	30,000	330	11.00	....	....	6	....	..	4	1	1	10	....	....	11
Lorain	32,000	411	12.84	126	37	24	....	..	....	1	4	9	1	....	5
Mansfield	22,000	208	9.45	....	....	8	....	..	....	....	2	2	1	1	2
Marietta	15,000	180	12.00	13	8	4	....	..	....	....	....	4	1	....	3
Marion	20,000	208	10.40	....	....	4	....	..	....	....	1	2	3	....	....
Martins Ferry	10,000	127	12.70	....	2	10	....	..	1	....	5	1	....	....	....
Massillon	14,400	140	9.72	....	....	....	....	..	....	1	2	5	....	....	1
Middletown	12,000	160	13.33	18	8	1	....	..	....	1	....	2	4	1	4
Mt. Vernon	12,000	117	9.75	14	10	....	....	..	....	....	....	....	3	....	....
Nelsonville	7,000	66	9.43	....	....	1	....	..	....	1	2	4	....	....	....
Newark	26,500	307	11.58	52	2	7	....	..	....	....	....	2	....	2	5
New Philadelphia	10,000	76	7.60	....	5	2	....	..	....	2	2	....	....	1	3
Niles	....	‡....	....	....	....	....	....	..	....	....	....	....	....	....	....
Norwalk	9,000	127	14.11	7	4	2	....	..	....	....	....	....	....	....	....
Norwood	15,000	146	9.73	2	6	2	....	..	....	....	1	....	....	1	4
Painesville	6,000	101	16.83	6	7	11	....	..	2	....	2	2	2	....	....
Piqua	15,000	149	9.93	7	4	3	....	..	....	....	....	2	....	....	....
Portsmouth	24,000	343	14.29	65	42	18	1	..	....	....	5	7	3	7	2
St. Marys	6,000	66	11.00	8	4	....	....	..	....	....	....	....	2	....	1
Salem	10,000	100	10.00	....	....	1	....	..	....	1	2	1	....	1	....
Sandusky	22,000	396	18.00	41	15	17	2	..	1	....	2	5	3	....	4
Sidney	6,000	79	13.17	5	5	1	....	..	....	....	....	5	1	....	2
Springfield	45,000	574	12.76	....	....	15	....	..	2	....	5	12	4	....	5
Steubenville	....	‡....	....	....	....	....	....	..	....	....	....	....	....	....	....
Tffin	14,000	137	9.07	8	....	3	....	..	1	....	....	....	3	1	....
Toledo	179,381	2,169	12.09	384	157	56	6	..	9	5	18	33	24	1	24
Troy	8,000	62	7.75	4	1	....	....	..	....	....	....	1	1	1	....
Urbana	7,020	118	16.81	6	4	1	....	..	....	....	....	4	....	1	1
Van Wert	8,000	61	7.62	....	....	1	....	..	....	....	2	....	....	....	1
Warren	12,000	118	9.83	....	6	4	....	..	....	1	....	3	1	....	....

ABSTRACTS OF REPORTS OF DEATHS AND THEIR CAUSES, DURING 1907.

General Diseases.							Diseases of Respiratory System.												
Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito-Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
44	7	25	4	27	88	73	89	19	63	36	3	2	..	....	40	33	42	13.	75
10	....	5	....	......	14	20	18	3	9	8	10	....	..	....	8	10	14	18	......
19	2	8	1	11	38	28	39	5	50	16	3	....	..	....	....	17	34	11	22
10	....	11	....	1	22	25	44	3	19	4	2	....	..	1	6	4	33	....	10
......	....	....	....	......	......	......	......	....	......	......	....	....	..	....	....	....	....	....	......
5	....	....	....	6	8	10	3	5	3	3	2	....	..	....	....	....	3	....	......
7	1	4	1	3	14	14	5	1	9	6	....	1	..	....	....	4	4	3	4
15	....	9	....	11	18	24	24	3	23	3	2	....	1	....	1	5	10	4	6
2	5	8	....	......	13	7	6	....	8	4	....	....	1	1	....	4	4	1	5
37	7	18	2	12	76	63	56	16	57	25	....	2	2	2	....	1	26	10	41
......	....	....	....	......	......	......	......	....	......	......	....	....	..	....	....	....	....	....	......
848	86	305	23	134	649	675	564	310	661	484	42	18	15	21	214	205	536	186	344
11	2	4	....	......	14	12	11	2	9	10	1	....	1	....	13	9	7	6	6
618	56	295	23	257	883	642	731	403	1,005	500	58	22	16	52	533	333	562	167	570
247	48	90	3	40	241	239	196	67	217	144	20	11	1	14	119	81	161	47	92
4	....	3	....	2	10	10	6	1	12	5	1	....	..	1	....	8	17	11	10
8	1	2	2	1	15	23	15	1	10	12	1	1	..	....	....	10	6	....	9
184	....	91	3	163	214	349	167	42	175	96	74	6	4	3	....	56	94	25	103
12	....	6	....	......	13	13	5	2	8	7	....	....	..	....	3	11	7	5	3
25	....	9	....	2	16	20	13	....	9	4	....	....	..	....	....	10	5	10	......
28	....	7	....	40	32	51	58	12	16	18	2	....	..	....	....	15	29	27	27
13	....	5	3	1	15	18	21	2	15	10	5	....	..	....	8	14	21	1	......
12	5	11	....	6	32	22	17	3	19	11	2	4	..	....	13	18	16	5	19
13	....	5	1	7	14	13	8	5	10	9	....	1	..	....	....	....	10	....	9
8	....	8	....	2	14	11	8	....	11	4	1	....	..	....	2	20	5	....	5
8	3	8	1	4	6	16	6	3	9	7	1	....	..	3	....	5	7	....	6
3	8	2	1	2	44	12	6	1	13	3	....	1	1	....	2	10	11	3	8
7	6	3	....	1	6	3	4	....	9	8	....	1	..	1	6	1	....	....	......
48	13	18	1	2	71	46	44	11	36	15	6	2	..	3	37	23	36	1	27
33	....	10	....	3	29	21	23	5	36	12	3	2	..	....	7	10	9	6	6
......	....	....	....	......	......	......	......	....	......	......	....	....	..	....	....	....	....	....	......
22	1	11	....	4	22	21	15	8	18	7	....	....	..	1	12	8	5	....	12
30	0	15	4	5	48	25	36	6	44	28	4	1	..	2	2	15	25	1	10
21	8	13	....	15	41	26	49	5	52	17	2	....	..	....	50	6	56	6	23
20	....	13	3	1	34	26	13	3	18	13	3	2	1	....	....	12	17	19	11
5	17	5	1	3	14	15	16	4	21	16	5	....	8	....	6	15	10	7	8
24	1	8	....	6	34	23	22	12	27	17	1	....	1	1	5	4	12	....	23
5	....	4	....	......	22	9	25	3	11	6	2	2	..	....	3	3	8	7	11
11	3	10	2	4	10	17	6	4	17	13	1	1	..	....	1	17	13	1	......
18	8	12	....	3	25	15	12	2	10	18	3	....	1	....	7	2	7	4	10
8	....	9	1	8	16	18	10	1	23	4	1	....	..	....	....	10	4	1	11
2	3	1	3	......	6	6	11	....	10	2	1	....	..	....	....	5	7	1	8
22	12	12	3	14	39	45	28	3	27	24	2	....	..	2	12	16	24	6	22
3	1	4	1	1	5	11	7	7	4	3	1	....	..	3	3	8	3	1	2
......	....	....	....	......	......	......	......	....	......	......	....	....	..	....	....	....	....	....	......
10	3	8	....	......	20	13	9	3	12	13	5	1	..	....	....	5	7	16	......
19	....	12	....	2	17	13	11	1	12	13	....	....	..	....	....	5	3	30	4
3	1	6	....	4	10	10	7	....	11	3	....	....	..	....	4	11	9	3	......
22	....	12	....	10	16	31	12	3	7	6	....	....	..	....	....	13	12	....	......
44	6	7	1	3	35	32	26	10	33	10	1	....	..	....	46	18	20	8	32
4	4	7	1	......	7	12	5	....	12	1	2	....	..	....	....	2	4	2	13
11	....	2	2	18	5	13	4	4	5	4	....	....	..	....	6	13	7	....	6
40	5	28	2	13	53	40	22	5	33	22	2	....	..	....	18	48	30	2	35
6	2	2	....	3	9	11	3	4	3	6	1	....	..	....	8	4	8	....	5
64	....	36	....	17	90	71	54	19	53	43	5	....	..	1	....	34	30	14	60
......	....	....	....	......	......	......	......	....	......	......	....	....	..	....	....	....	....	....	......
15	2	6	....	8	19	20	7	4	17	12	....	....	1	....	....	10	5	3	......
192	31	99	6	54	253	207	199	86	265	120	40	11	1	10	104	114	147	54	225
23	....	1	....	3	1	3	11	4	......	1	....	1	..	....	1	8	2	5	......
15	1	5	2	9	13	15	11	3	10	6	1	2	..	....	....	6	9	3	4
4	4	5	....	4	9	6	4	1	3	4	....	....	..	....	1	5	2	5	......
3	....	11	....	......	15	8	22	4	7	17	....	....	..	....	....	11	10	1	10

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Concluded.

Cities.	*Estimated Population.	Total Deaths.	Annual Rate per 1000.	Age.		General Diseases.									
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.	Purulent and Septicemic Infections.
Washington C. H.	....	‡.....	......	......	......	......	....	..	....	....	....	....	....	....	....
Wellston	9,000	99	11.00	1	......	3	....	..	....	....	1	....	1	2	....
Wellsville	9,000	102	11.33	11	19	......	....	..	....	....	....	3	3	....	....
Wooster	....	‡.....	......	......	......	......	....	..	....	....	....	....	....	....	....
Xenia	....	‡.....	......	......	......	......	....	..	....	....	....	....	....	....	....
Youngstown	65,000	1,035	15.92	245	133	20	....	..	28	....	1	19	5	2	6
Zanesville	27,000	400	14.81	......	......	22	....	..	5	2	....	6	1	2	12
Total	2,290,281	31,586	13.79	4,945	1,896	731	18	..	116	167	148	393	240	99	272

* By health officer.
† 365 non-resident deaths not included.
‡ No report received.

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Concluded.

General Diseases.							Diseases of Respiratory System.												
Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito-Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
....	....	....	....	......	......	......	......	....	......	......	....	....	..	....	....	....	....	....	....
9	....	2	....	7	15	16	3	1	12	3	1	1	2	....	....	3	12	5	10
9	....	6	....	......	19	17	11	1	10	7	3	1	..	....	....	7	4	1	11
....	....	....	....	......	......	......	......	....	......	......	....	....	..	....	....	....	....	....	......
....	....	....	....	......	......	......	......	....	......	......	....	....	..	....	....	....	....	....	......
74	8	32	2	39	111	69	142	29	143	43	9	1	4	8	54	57	108	21	......
36	7	18	8	10	39	39	30	10	36	44	7	4	1	....	3	27	31	....	16
3,073	384	1392	111	1,006	3,681	3,363	3,030	1175	3,487	2,010	342	102	62	130	1358	1524	2360	787	1,992

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907.

Villages.	*Estimated Population.	Total Deaths.	Annual Rate per 1000.	Age.		General Diseases.							
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.
Aberdeen	700	5	7.14	1	1								
Ada	3,500	32	9.14	3							1		2
Adamsville	250	2	8.00										
Albany	540	17	31.48			1					2		
Alexandria	450	2	4.44										
Alger	900	11	12.22								4	2	
Amelia	350	1	2.86										
Anna	500	7	14.00	1	1								
Antwerp	1,200	14	11.67		3	1							
Apple Creek	400	2	5.00										
Arcadia	500	6	12.00										
Arcanum	1,350	20	14.81	2	3				1				
Archbold	1,200	6	5.00		1	1							
Arlington Heights	428	4	9.35										
Arnettsville	225	7	31.11		1								
Ashland	8,000	98	12.25	8	1	2						1	1
Ashley	800	8	10.00										
Ashville	1,100	11	10.00			1							
Athalia	346	8	23.41										
Athens	6,000	54	9.00	1	8	2	1				1	3	2
Attica	1,000	22	22.00	1								1	2
Avon	1,500	11	7.33	1									
Baltimore	650	13	20.00										
Barberton	8,000	83	10.37	21		2							
Barnesville	4,500	76	16.89			4			2				4
Basil	500	4	8.00										
Batavia	1,100	20	18.18		2								
Batesville	350	7	20.00	1									
Beaver	350	1	2.86		1					1			
Bedford	2,300	26	11.30		4	1						2	
Belle Center	1,300	14	10.77										
Bellville	1,000	16	16.00										
Belpre	1,300	16	12.31	1	3								
Berea	2,500	63	25.20	4	5	2				1			
Berlin X Roads	500	2	4.00		1	1							
Berlin Heights	800	5	6.25										
Bethel	1,200	19	15.83		1								
Bettsville	550	5	9.09						1				
Beverly	800	14	17.50		2	1					1		
Blanchester	2,000	37	18.50										
Bloomdale	700	10	14.29										1
Bloomingburg	700	11	15.71	2									
Bloomville	850	27	31.76	1	1	1							1
Bluffton	2,600	10	3.85			1							1
Bolivar	700	7	10.00										
Boston	400	3	7.50										
Botkins	800	10	12.50										
Bowerston	600	2	3.33										
Bowersville	450	6	13.33										
Bradford	1,750	28	16.00		2	2			1				
Bradner	1,150	15	13.04	1	2		1						
Bratenahl	700	3	4.29										
Bridgeport	3,963	39	9.84			2							1
Brooklyn Heights	300	5	16.67		2								
Brookville	1,200	10	8.33										
Bryan	4,000	51	12.75										
Buchtel	1,200	7	5.83									1	
Butler	1,000	4	4.00										
Butlerville	125	1	8.00										
Byesville	4,000	27	6.75	1	4							2	
Cadiz	2,000	23	11.50	1	1								
Caledonia	750	11	14.67		1								
Canal Winchester	1,000	8	8.00										

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907.

General Diseases.									Diseases of Respirato'y System.												
Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito-Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
						1		1			1		1						1		
		6		1			2	4	4		1	5					1	2	2	1	3
																	1	1			
		2					2	1			2	1						5		1	
								1			1										
				2				1										2			
												1									
1	1							2	1		1							1			
				1			1	1	1	1	3			1				1		3	1
												1								1	
		1						2										1	2		
		5					3	4	1	1	1						2	1			
		2					1					1						1			
							1		1			1							1		
		3					3	1													2
1	4	12	1	4	3	2	11	20	8	1	9	10			1			1	3	3	4
								3	1			1	1					2			
		2	1	1			1	2										1	2		
		1		1	1		3	2													
		4		2			6	7	9	1	3	2	1					3	7		
		4		2	1	1		6	1		1	2						1			
				2				2	2		1	1						2	1		2
							4	3	5										1		
	2	8		2			12	8	7	1	10	7					7	4	11	2	1
		10		4			7	11	18		2							4	5	2	
								4													
		2					1	7	1		3	3						2		1	
			2			1	3	1													
			1	2			4	5	5	2	3							1			
		2					2	2		2	3							3			
		1		2			2	4	1		1	1					2		1	1	
		4		1			3	3	1		1	1						2			1
1		6		4		1	6	8	4	2	4	4					1		7	3	2
							1														
								3											2		2
1		5				2		4			3	1								3	
				2			1	1													
							1	3	1	1		1							2	3	
		5			1		7	5			3		1				4	5	4	2	1
									2								2		2	2	
1				2			1	1	1		1	1						3			
1		6		1			1	2			5	4						1		4	1
		1		1				3										2	1		
		1					2											3	1		
								1			1	1									1
			1			1	1	5			1		1								
						1													1		
				1			1	1		1		1						1			1
		6	1	3	1	1	2	2	2		4		1								
		1		1			1	3	1		1								4	2	
							1		1	1											
	1	4		1		3	4	2	6		4	4	1					3	3		
									4										1		
		3					3	2				1	1								
	1	8				1	8	9		1	5	3	1					5	5	4	1
								1			1								4		
			2					1										1			
							1														
		5					1		4				1				4	1	3	1	4
	1	5		1			2	2	5	2	3	2									3
		3									2	1					1	2	1	1	
		2		2			2	1	1												

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

Villages.	*Estimated Population.	Total Deaths.	Annual Rate per 1000.	Age. Under One.	Age. One to Five.	General Diseases. Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.
Canfield	800	9	11.25	1									
Cannelsville	600	7	11.67			1							
Cardington	1,500	10	6.67			1							
Carey	2,500	40	16.00	2	9	1							
Carrollton	2,000	20	10.00			3					1		
Carthage	3,000	31	10.33	2									
Casstown	300	4	13.33										
Cedarville	1,200	15	12.50		1	1							1
Celina	4,500	58	12.89	1	6				1			1	2
Centerburg	900	8	8.89										
Centerville	250	2	8.00										
Chagrin Falls	2,200	31	14.09		3								
Chardon	1,500	21	14.00	3		1							1
Chesterville	250	8	32.00		1	1							
Cheviot	1,500	18	12.00	1	3	2							1
Clarington	900	8	8.89		1								
Clarksville	600	9	15.00	1	1								
Cleveland Heights	3,000	7	2.33	1						1		1	
Cleves	2,000	1	.50			1							
Clifton	250	5	20.00										
Clyde	3,000	44	14.67		3								
College Corner	400	7	17.50										
College Hill	1,600	18	11.25										
Collinwood	8,000	89	11.12	25	4	2				2		2	1
Columbiana	1,800	18	10.00		3	3				7			
Congress	225	1	4.44										
Corlett	5,000	1	.20										
Corning	2,000	14	7.00		4	2						1	
Corwin	150	3	20.00		1								
Covington	2,000	39	19.50	4	1								
Crestline	4,000	64	16.00	6	3	3							
Creston	1,200	12	10.00	1									
Cridersville	800	10	12.50	1	1								1
Croton	400	5	12.50										
Custar	400	1	2.50										
Cuyahoga Falls	4,000	62	15.50	1		2	1				1		
Dalton	650	7	10.77										
Deavertown	225	6	26.67	2									
De Graff	1,200	15	12.50			1							
Delhi	1,000	11	11.00	2		1							1
Delphos	5,000	41	8.20	10	1								
Dennison	4,500	35	7.78	4	1						1		
Deshler	2,000	9	4.50										
Dillonvale	3,000	19	6.33	5	2	1							
Doylestown	1,100	8	7.27										
Dresden	2,000	26	14.00	2	2								
Dublin	300	2	6.67										
Dunkirk	1,200	18	15.00										
Dupont	500	8	16.00										
East Cleveland	10,000	41	4.10	9		1							1
East Palestine	4,500	44	9.78	7	8	2	1				1		
*Eaton	3,155	21	6.66						1				
Edgerton	1,200	16	13.33										
Edison	450	5	11.11										1
Edon	800	11	13.75										
Eldorado	400	7	17.50	1									1
Elmwood Place	3,500	39	11.14	5	3	1						2	1
Fairfield	300	1	3.33										
Fairport Harbor	2,200	28	12.73			1							
Farmersville	440	10	22.73		2								
Fayette	900	6	6.67		1								
Felicity	680	11	16.18			1							
Fern Bank	300	2	6.67										

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

General Diseases.									Diseases of Respirato'y System.												
Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
....	....	....	....	....	....	....	2	1	....	2	....	....	....	....	....	....	....	3	1	....	....
....	....	....	....	....	....	....	1	....	....	....	1	....	1	....	....	....	1	....	2	....	1
....	....	1	....	....	....	....	....	2	....	1	....	2	....	....	....	....	....	3	....	....	1
1	....	6	1	....	....	....	1	7	....	....	5	....	....	....	....	1	1	1	3	12	....
....	....	....	....	....	....	....	4	4	2	....	1	1	....	....	....	....	....	3	1	....	1
....	....	3	1	1	....	....	4	3	4	1	1	5	....	....	....	....	....	3	1	3	7
....	....	....	....	....	....	....	....	2	....	....	2	....	....	....	....	....	....	....	....	....	....
....	....	1	....	2	....	....	....	1	2	....	1	....	....	....	....	....	....	3	2	....	2
....	1	10	....	2	....	....	12	7	1	....	4	3	2	1	....	....	2	2	5	1	....
....	....	....	1	2	....	....	....	1	2	....	....	....	....	....	....	....	....	2	....	....	....
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2	....	2	....	....	1	....	4	7	4	....	....	4	....	....	1	....	....	4	1	1	....
....	....	....	2	....	....	....	1	2	2	....	....	....	....	....	....	....	3	4	1	4	....
....	....	1	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	5	....	....	....
....	....	1	1	....	....	....	5	1	4	....	1	....	....	....	....	....	....	1	1	....	2
....	....	....	....	....	....	....	1	1	....	....	....	....	....	....	1	....	....	2	2	1	....
1	....	2	2	1	....	....	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....
....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	1	1	1	....	....
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....
3	....	1	3	3	....	3	3	10	2	3	4	3	....	....	....	....	....	4	1	1	....
....	....	....	2	....	....	....	....	3	1	....	....	....	....	....	....	....	....	....	1	....	....
....	....	3	1	....	....	1	2	3	6	....	....	....	....	....	....	....	....	....	2	....	....
....	3	2	....	2	....	12	9	11	8	1	4	9	2	....	....	....	11	2	6	....	....
....	....	....	....	....	....	....	1	1	....	3	....	1	....	....	....	....	....	2	....	....	....
....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....
....	....	1	....	....	....	....	1	1	1	....	1	1	....	....	....	....	....	2	2	1	....
....	....	....	....	....	....	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....
....	....	4	....	5	....	1	6	7	1	1	1	2	1	....	....	....	....	7	3	....	....
....	....	5	....	4	....	....	6	13	10	4	8	3	....	....	....	....	4	2	2	....	4
....	....	1	....	2	....	....	1	4	2	....	....	....	....	....	....	....	....	1	1	....	....
2	....	3	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....	1	1	....	....
....	....	....	1	....	....	....	....	2	....	....	....	....	....	....	1	....	....	1	....	....	1
....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....
....	....	4	....	....	....	....	13	12	7	2	3	7	....	....	....	....	2	4	3	1	2
....	....	....	....	....	....	....	1	2	1	1	....	1	....	....	....	....	....	....	1	....	....
....	....	....	....	....	....	....	1	....	....	....	2	....	2	....	....	....	....	1	....	....	....
....	....	....	....	3	....	....	1	1	1	1	4	....	....	....	....	....	....	....	2	1	....
2	....	1	....	....	....	....	....	....	2	1	....	....	....	....	....	....	2	1	....	....	....
2	2	4	....	2	....	....	6	3	3	....	5	8	1	2	....	....	....	....	2	1	7
....	....	5	....	2	....	....	6	5	2	....	7	1	....	....	....	....	....	2	3	1	3
....	....	....	2	....	....	....	1	1	....	1	....	....	....	....	....	....	....	1	3	....	....
....	....	2	1	....	....	....	....	....	4	....	6	1	....	....	....	....	1	....	3	....	1
....	....	....	....	1	....	....	1	3	....	....	....	....	....	....	....	....	....	....	1	2	3
....	....	9	....	....	1	....	6	2	1	....	....	....	....	....	1	....	....	6	2	....	....
....	....	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
....	1	4	....	1	....	....	2	3	1	....	....	1	1	....	....	....	....	....	1	3	....
....	....	2	....	....	....	....	1	....	2	....	1	1	....	....	....	....	....	....	1	....	....
....	....	5	4	....	....	....	7	7	1	3	1	....	....	1	....	....	....	....	6	....	7
1	1	5	....	3	....	1	11	2	1	3	5	2	....	....	....	....	....	1	3	1	2
....	....	5	....	1	....	....	4	4	....	....	2	1	....	....	....	....	....	....	2	1	2
....	....	1	....	....	....	....	1	3	....	1	....	....	....	....	....	....	....	....	2	8	....
....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	....	1
....	....	....	....	1	....	....	1	3	....	2	1	2	....	....	....	....	....	1	....	....	....
....	....	....	....	....	....	....	....	2	....	....	1	1	....	....	1	....	1	....	....	....	....
....	....	4	3	1	....	2	3	3	3	2	4	3	1	....	....	....	....	2	4	....	1
....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
....	1	1	1	....	....	....	....	4	4	1	2	5	1	....	1	....	....	1	4	1	3
....	....	2	....	....	....	....	2	1	....	....	3	....	....	....	1	....	....	....	....	1	....
....	....	....	....	1	....	1	....	1	....	....	3	....	....	....	....	....	....	....	....	....	....
....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	2	1	4	....
....	....	....	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	1

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

Villages.	*Estimated Population.	Total Deaths.	Annual Rate per 1000.	Age.		General Diseases.							
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.
Fletcher	500	7	14.00						1				
Fort Jennings	340	1	2.94										
Frankfort	800	8	10.00										
Franklin	3,000	42	14.00	1	4							1	1
Frazeysburg	650	5	7.69							5			
Fredericktown	1,000	14	14.00		2								
Freeport	800	11	13.75	1	2							1	
Garrettsville	1,200	18	15.00										
Geneva	2,400	33	13.75	1									
Genoa	824	11	13.35		2								
Georgetown	1,800	12	6.67										2
Germantown	1,800	34	18.89	2		1					1	1	
Gibsonburg	2,000	19	9.50		1				1			2	
Girard	3,500	37	10.57									1	
Glendale	1,550	19	12.26	2		2							
Gordon	300	3	10.00										
Grafton	1,300	18	13.85		2	1			1				
Grand Rapids	600	11	18.33		1								
Green Camp	400	4	10.00										
Greenfield	4,800	66	13.75									6	
Groveport	650	4	6.15										
Grover	450	2	4.44										
Grover Hill	900	7	7.78	1	2								
*Hamden Junction	838	3	3.58										
Hamler	700	4	5.71										
Hanging Rock	650	5	7.69		2							1	
Harrison	1,800	6	3.33										
Harrod	450	5	11.11									2	
Hartwell	2,500	26	10.40		4								
Harveysburg	435	10	22.99										1
Haviland	325	3	9.23	1									
Hemlock	500	1	2.00										
Higginsport	500	9	18.00		1								
Hillsboro	5,000	43	8.60	1									
Holgate	1,276	10	7.84		3	1						1	
Holloway	700	11	15.71	1	2				1				
Holmesville	304	5	16.45										
Hoytville	500	9	18.00		1	1			3				
Hubbard	1,500	33	22.00	7		1							1
Hudson	1,000	20	20.00	3	1								1
Huntsville	450	3	6.67										
Huron	2,400	37	15.42	3	2								
Ithaca	225	4	17.78										
Jackson	7,000	74	10.57		1	2							4
Jackson Center	800	5	6.25										
Jamestown	1,500	20	13.33		1							2	1
Jefferson	1,400	25	17.86			1							
Jeffersonville	800	10	12.50		1				1			1	
Jenera	242	2	8.26										
Jeromeville	400	9	22.50										
Jerry City	600	11	18.33									5	
Jerusalem	300	6	20.00	1		1							
Junction City	600	7	11.67										
Kelly's Island	1,174	20	17.03	3									
Kettlerville	150	1	6.67										
Kimbolton	300	5	16.67		1								
Kirby	150	1	6.67										
Lafayette	400	2	5.00										
Lakewood	10,000	70	7.00	8		4				1		1	
Larue	1,000	10	10.00	1									
Lebanon	3,000	45	15.00			1					2		3
Leetonia	3,000	41	13.67	5	2								
Lewisburg	600	8	13.33			2							

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

General Diseases.									Diseases of Respirato'y System.												
Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
		1		2				2	1												
		1																			
						1	1	2									2			2	
		3	1	1		1	6	6	4	1	2	3	1				1	5	5		2
																					2
2				2			4	2	1									2	1		2
		2		1			1	1			3								1	1	2
		1	2	5			3	2	2		1							1		1	
		2	1				4	5	1	1	1	3	1				1	10	3		3
			1				1		1		2							3		3	
		4		1			1			1	1								1		
		2		5			2	7	5	1		2			4			1		2	
			1			9		2		1									1	2	
		1				4	7	3	1		4	6						2	8		2
		1		2		4	2		2			4	1						1		
								1										2			
		1		2				2	1		2	1						6	1		4
		2		1			1	4				1						2			
								1	1									2			
									1			1								2	
		1																1			
1							1	1	1										1	2	
																		1	2		
									1									2	1		
									3			1									
		1						1										1			
		4	2				3	9			3	1	1				1		2		2
		1						4	1		1	1						1			
									1		1		1								
																			1		
		4		2			3														
		6	1	2	2	4	4	3	4	1	3	2						7	1	3	1
				2					1		1						1			3	
		2		1				1	1		2						1		2		
		2		1				1			1										
									2						1						
				1			3	9	3	2	2	5				1			5		
							1	3	5		5	3						2			1
				1		1												1			
		1	1	2		3	3	3	3		2	2			1			2	5	7	1
							2					1							1		
		6	6	2		1	3	18	10	7	5	2							1	7	
1			2			2															1
		1	2			5	1	3	3									2			
		3		1			1		2			7						9	1		
		3	1								1							1	1	1	
		1																1			
		1		2			3	1			1							1			
		1									3							2			
							2	1	1								1				
		1						1	1	1		1					1		1		1
		2				2	4	3				1			1			4	3		
																		1			
1				1				1									1		1		
												1									
											1	1									
1		1		2		10	7	13	7		9	4	3					2	5		4
				2		1	2		1		1						1	1		1	1
		4	2		2		5	7	1	2	5	2			2			3			4
		2		2			5	7	5	2	4	1			1			3	5	3	2
						3											2	1			

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

Villages.	*Estimated Population.	Total Deaths.	Annual Rate per 1000.	Age. Under One.	Age. One to Five.	General Diseases. Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.
Lewisville	400	2	5.00										
Lockland	3,500	40	11.43										
Lodi	1,200	20	16.67										
London	4,000	49	12.25	1	4	2					1		
Lore City	750	3	4.00			2							
Loudonville	2,000	37	18.50	2	1	2							
Louisville	1,800	16	8.89	1								1	
Loveland	2,000	18	9.00	1	1								
Lowell	500	3	6.00										
Lucas	306	4	13.07										
Lynchburg	907	11	12.13	1									1
Lyons	500	4	8.00										
McComb	1,200	11	9.17									1	
McConnelsville	2,000	30	15.00			1						1	
Macedonia	560	8	14.29	2									
Macksburg	550	3	5.45		2								
Magnetic Springs	200	2	10.00										
Magnolia	431	9	20.88										
Maineville	400	7	17.50										
Malinta	400	7	17.50	1	1								
Malta	950	5	5.26							5			
Malvern	800	8	10.00										
Manchester	3,000	30	10.00			6						1	
Marengo	300	5	16.67										
Marseilles	400	4	10.00										
Marysville	5,000	38	7.60	4		2							
Maumee	3,000	58	19.33	3	1	7							2
Mechanicsburg	1,600	28	17.50	2							1		
Medina	2,000	26	13.00										
Melrose	450	5	11.11										
Mendon	600	2	3.33										
Miamisburg	5,000	59	11.80			2			6				1
Middlefield	700	2	2.86										
Middleport	3,500	37	10.57	3	3	1							
Midland City	390	4	10.26			1							
Milford	1,500	21	14.00	2	1							1	
Millbury	300	4	13.33										
Mineral Ridge	1,200	16	13.33									1	
Minster	1,500	19	12.67	2	2								
Montpelier	2,600	18	6.92										
Morristown	352	7	19.89										
Mt. Blanchard	500	8	16.00										
Mt. Cory	300	4	13.33										
Mt. Eaton	250	4	16.00										
Mt. Gilead	2,000	11	5.50									1	
Mt. Healthy	1,800	20	11.11	1									
Mt. Orab	700	10	14.29									1	
Mt. Pleasant	800	5	6.25			1							
Mt. Sterling	1,000	22	22.00	1	1								
Mt. Washington	800	5	6.25										
Murray City	1,300	15	11.54	3	1	1				1	2	1	
Nashville	250	3	12.00										
Navarre	1,700	21	12.35	1	1	1	1			1		2	
Nevada	1,200	10	8.33	2	1	1							
Neville	300	8	26.67		1				1				
New Bloomington	500	4	8.00										
New Bremen	2,000	14	7.00	3		1							
Newcomerstown	4,000	39	9.75			1				4	2		
New Lebanon	200	1	5.00	1									
New London	1,500	10	6.67										
New Madison	590	6	10.10										1
New Matamoras	800	6	7.50		1					1			
New Richmond	2,500	31	12.40		3	2	1					1	4

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

General Diseases.									Diseases of Respirato'y System.												
Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito-Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
						1							1								
		4	4		1	11		3	4		3	5							5		
	2						4	4	1		1	3	1						3	1	2
1	1	6	1	3		1	4	6	3	1	5	6	1	1			2	1	3		5
			1																		1
		3	1	1			4	7	1	2	1	3							3	9	
		1	1	1			1	2	3		2							3	1		
				1		1	1	5	1	3	1	4					1				
																		3			
							2		1			1									
				1	1	1						1	1					5			2
				1			1					1							1		
		1	1				2					1							1	4	
			1				1	9				1						5		11	
								2				1					2	2		1	
							2					1									
								1											1		
			1						1		5				1				1		
1		1		2			2											1			
		1						1			2						1	1	1		1
		3				1		1			1	1									1
		10		1			1	6			1							3	1		3
				1		2		1										1			
										1								3			
		11		2			7	1	5		4	2						2	1	1	
		4	2	5	3	4	1	4	7	5	2	1	3					5		3	
		4					5	5	2		4							3	3	1	
																		3		23	
		1					1	1	1									1			
				1				1													
	1	8		4		5	5	12	6		2	3		1			1		1	1	
						1	1														
	2	2		1			5	9	4	1	1	2						2	3	4	1
				1														2			
	3	3		4		2	1	1				5							1		4
												1						1	2		
		1					1	3	3		2	3						1	1		
			2	1			2	3	3	1	1	3						2	1		
				2		1	3	1	2	2	2	2	1						2		
							1		3									1	1	1	
			1	1		1	1				1	1						1	1		
		2						1				1									
								1		1								2			1
				1			3	1										1	3	1	4
		5		2			2	3	2	1	1	2						1	1		
1	1	1		1				1								1		2	1		
			1															2		1	
		4		2			1	6	1	1	4		1	1				1			
									1		1		1			1				1	
		1						1	2		1	1	1				2		1		2
						2		1													
		1				1	3	3	1	1	2	1			1			2			2
				1		1	1		1									5			3
		2		2				1	1									1			
		1						1			1								1		
		1		1			2	1	2			1	1				2		2		
		6	1	5		1	3	3	1		4						4	3	1		
							1														
			1	1			2	1				2						2	1		
	1	1								1								2			
				1					2	1								1			
1		4		1					6		10	1									

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

Villages.	*Estimated Population.	Total Deaths.	Annual Rate per 1000.	Age.		General Diseases.							
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.
New Riegel	300	5	16.67										
New Salem	200	10	50.00	1									
Newtown	600	11	18.33	3	1								
New Vienna	800	8	10.00		1								
New Weston	325	4	12.30		1								
Ney	450	4	8.89										
North Amherst	2,000	31	15.50	3						1	1		
North Baltimore	3,500	68	19.43									1	
North Robinson	200	1	5.00										
Nottingham	1,800	26	14.44	2	7	2						1	
Oakley	1,200	9	7.50	2									
Oakwood	500	12	24.00										
Oberlin	5,000	65	13.00	1	3					1	2		2
Ohio City	1,000	10	10.00	1	1								1
Olmsted Falls	413	1	2.42										
Orangeville	350	3	8.57										
Orrville	3,000	24	8.00	1									
Osgood	302	1	3.31										
Osnaburg	600	2	3.33										
Ostrander	525	5	9.52										
Ottawa	2,500	11	4.40	1									
Ottoville	600	2	3.33										
Oxford	3,000	26	8.67									1	2
Palestine	250	5	20.00	1									
Pandora	800	14	17.50		1	2							1
Payne	1,580	11	6.96										
Peebles	850	19	22.35	1		4							
Peninsula	500	12	24.00			1							
Phillipsburg	350	6	17.14		1								
Pioneer	800	12	15.00										
Plain City	2,000	29	14.50	4							1		
Pleasant City	1,200	7	5.83	1	1								
Pleasant Hill	800	7	8.75	1									
Pleasant Ridge	1,100	17	15.45										
Pleasantville	501	9	17.76	2		1							
Port Clinton	3,000	56	18.67	12	2							1	1
Port Jefferson	400	7	17.50										
Port William	600	2	3.33										
Prairie Depot	900	9	10.00										
Prospect	1,100	11	10.00						1				
Quaker City	878	10	11.39			1							
Quincy	750	7	9.33							2			
Racine	800	5	6.25										
Rarden	500	6	12.00									1	
Ravenna	5,000	101	20.20	1						1	1		
Reading	4,000	37	9.25	5		2							
Rendville	790	6	7.60		1		1					2	
Reynoldsburg	500	4	8.00										
Richmond (Lake Co.)	170	1	5.88										
Richwood	2,100	37	17.62										
Ripley	2,500	38	15.20	2	5	1					1	1	
Rising Sun	800	9	11.25									1	
Rochester	200	6	30.00									1	
Rock Creek	600	2	3.33	1									
Rockport	2,600	12	4.62	1									
Rocky Ridge	450	2	4.44		1								
Rocky River	800	9	11.25	1									
Rogers	200	1	5.00										
Rushville	300	7	23.33										
Sabina	2,000	28	14.00	4	4				1				1
St. Bernard	5,000	48	9.60	6	6	4							
St. Henry	800	14	17.50			1							
St. Paris	1,550	20	12.90										

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

General Diseases.									Diseases of Respirato'y System.												
Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito-Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
			1					2		1										1	
2							4	2			1	1									
		1	1			1		2		1	2						1	1	1		
		2					1	1		2		1						1			3
		2									1	1									
							1		1	1										1	
	1	3		3		2	3	2	3	1	1	1	1				1	4	2	1	1
2		4	6	4		6	7	6	6	5	7	2	1					2	4	5	5
			1																		
		2	1				3	2	2	2	2	2						2	3	2	
		2		1			3	1			1	1									
						8	1		1			1						1			
1	1		1	8	1	1	4	12	5	5	5	7						7	2		
		3						1	1								2	1	1		
																		1			
							2		1												
1		1	1	2			1	2	2		5	1					2	2	3	1	3
								1													
							1													1	
								1									3		1		
	2	2		1	1				3		1							1			
									1									1			
		1		1			8	7		1	2	2	1								
							1				1							2		1	
1		3								1			1				1	4			1
				1				4				2					1		1	2	
	1	1		1			3	1	2		3		1					2			
							1			1									1	8	
							2		2		1	1									2
1		1					3	1		1	2				1			1	1		
		4		1		2	2	3		1	1	6					4	4			
		1					1					1	1						2	1	
	1						2	1				1					1		1		
		1					4	5	2			2	1		1			1			
3		4					1														
	1	4		1			5	8	6		4	3	1	1			9	1	5	5	
	1							2				1					1			2	
								1										1			
				1	1		1	1			1	1					1	1			1
				2				5			1	1						1			
								3	3		2								1		
		2		1				1	1												
	1			1			2	1													
							1	2										1		1	
5		9		8	1	16	4	18	13	1	2	4						6	10	2	
		3	1	3	2	1	4	2	2	3	2	1			1			3	3	4	9
											1	1							1		
		1	1	1	1																
																		1			
		3		6		3	6	8				1						1	2	7	1
	1	10	1			2	4	4	4		1	2			1		2		1	2	
				2				1									5				
	1						3											1			
				1								1									
		3					2	1			1								4	1	
											1								1		
		1		1			1	2				1	1					1	1		
																		1			
	2							3	1									1			
		1	1		1	2	7	2	1	3		1	1				1	3		2	
		4					6	6	7		4	5						8	2	2	1
									8								2	3			
	1	4		2		1	1	5	2									4			2

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

Villages.	*Estimated Population.	Total Deaths.	Annual Rate per 1000.	Age.		General Diseases.							
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.
Salesville	280	2	7.14										
Salineville	2,600	32	12.31			2						1	
Sarahsville	200	4	20.00	1									
Savannah	300	9	30.00			4							
Scott	600	10	16.67				1						
Sebring	2,900	9	3.10		2								
Shanesville	1,000	4	4.00										
Shawnee	3,500	15	4.28	2	3						1		
Shelby	6,000	65	10.83	4	4	1			1				1
Shiloh	650	7	10.77										
Shreve	1,043	8	7.67	4									
Silverton	340	2	5.88		1								
Sinking Spring	250	3	12.00										
Smithfield	700	10	14.29	1									
Smithville	500	8	16.00										
Somerset	1,200	10	8.33										
South Lebanon	700	9	12.86			1			1				
Spencerville	2,600	13	5.00		2	1							
Spring Valley	600	3	5.00										
Stockport	400	3	7 50										
Strasburg	1,000	10	10.00			4							
Struthers	3,500	29	8.21	8	3						1		2
Stryker	1,400	6	4.29										
Sugar Creek	400	4	10.00										
Sylvania	950	14	14.73			2						2	1
Taylorsville	500	12	24.00							1			
Thornville	460	9	19.56		1								
Tippecanoe City	2,050	23	11.22	1	1								
Tontogany	375	8	21.33		1								
Toronto	5,000	19	3.80										
Trenton	650	4	6.15										
Trimble	700	10	14.29										
Trotwood	300	2	6.67										
Tuscarawas	500	6	12.00	1									
Uhrichsville	5,000	50	10.00	5	2	1							
Union City	1,500	20	13.33	1	1	1							
Unionville Center	400	4	10.00										
Uniopolis	300	1	3.33	1									
Utica	3,000	19	6.33	1	3							3	
Vandalia	350	2	5.71	1									
Vermillion	1,500	18	12.00	1	1								
Versailles	1,650	23	13.94	1	1								
Vienna Cross Roads	400	6	15.00	1									
Wadsworth	3,000	33	11.00	5		2							
Wapakoneta	5,647	46	8.50	8	2				1		1		1
Washington	400	9	22.50										
Washingtonville	1,000	13	13.00		1								
Waverly	1,900	14	7.37										3
Waynesfield	800	7	8.75		1	2					1		
Waynesville	723	26	35.96	1									
West Alexandria	1,200	11	9.17	2	1							1	
Western Star	248	6	25.80										
Westerville	2,000	17	8.50			2							3
West Jefferson	1,000	13	13.00			1							
West Liberty	1,200	13	10.83										2
West Manchester	500	4	8.00						1				
West Mansfield	1,200	15	12.50	1	1								
West Millgrove	250	1	4.00										
West Milton	1,500	5	3.33	1									
Weston	1,100	6	5.45										
West Rushville	200	2	10.00										
West Salem	700	9	12.86										
West Union	1,300	10	7.69	2		1							

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

General Diseases.									Diseases of Respirato'y System.												
Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
																	1	1			
		4					2	1	1		7	7							3	4	
				1								1					1			1	
																	4	1			
		1		1			1	3		1	1							1			
		1				2					5	1									5
							2											2			
		2	2			3	2	2										1	2		
1	4	5		3		2	10	5	5		2	10	2					6	7		6
	1							1	2									2	1		
															1		4	2	1		
											1	1									
		2						1													
																		8	1		
				2			1	1	2									1		1	
		1	1	1			2	1									3	1			3
		1											1				2	1	2		
				1		1	1	2		2								2	2	1	2
				1				2													
		2					1														
		1					1	1	1		1	1									
			2			5	7	7	1		1						1		2		3
			1								2	1						2			1
1				1					1		1										
		1					5				1								2		2
		2					2											6	1		2
		4				2	1	2													
							1	2		2	6	1						5	2	2	2
		1					1				3	3									
		5		1		5	3		1		4										
				1			1					2									1
		2				6											2				
		2																			
							2	1	1									2			
1	5	4		5			3	5		1	9	5			1			3	4	3	1
	1	6					1	4	1		1	1			2				1	1	
																		4			
1																					
		1	1	1		1		1	3		2	1	1				1	2	1		
										1	1										
				2			2	5										4	1	4	
		1		3			4	4		3	4	2					1		1		
							1		1	1	1	2									
1		4		3		1	4	3	3	1	5	3			1			2			
		4		3	1		6	1	2	1	9	3						6	4	3	1
				1			2	4							1				1		
	1						2	1	2	1		3							3		
	1			1			2		3		2							1	1		1
		1					1	2													
		4	1	1			4	1	2		3	2				1		4	1	2	
		1	2				1		1		1							1	1	2	
																	5			1	1
		1					4	2		1		1						2	1		
		2					1	1				1						5	2		1
		1		2				2	2		1	1						1	1		
						1		1									1				
		4		1				1			2	1						2		4	
								1													
		1		1			1					1							1		
							1		1			3						1			
		1					1														
		3		1				1			1	1						1		1	
		2					4	1			2										

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Concluded.

Villages.	*Estimated Population.	Total Deaths.	Annual Rate per 1000.	Age.		General Diseases.							
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.
West Unity	1,000	16	16.00	......	......	......	....	....	....	....	....	......	....
Wharton	600	2	3.33	......	1	......	....	....	....	....	....	......	....
Whitehouse	625	26	41.60	......	......	......	....	....	....	....	....	......	....
Williamsburg	1,300	16	12.31	3	......	1	....	....	....	....	....	1	....
Williamsport	600	11	18.33	......	......	......	....	....	....	....	....	......	....
Willshire	550	5	9.09	......	......	......	....	....	....	....	....	......	1
Wilmington	4,000	31	7.75	......	......	1	....	....	....	....	....	......	1
Windham	350	3	8.57	......	......	......	....	....	....	....	....	......	....
Woodsfield	3,000	36	12.00	......	......	2	....	....	....	....	1	1	....
Worthington	600	2	3.33	......	......	......	....	....	....	....	....	......	....
Wyoming	1,800	14	7.78	......	3	......	....	....	....	....	....	......	....
Zoar	250	5	20.00	......	......	1	....	....	....	....	....	......	....
Total	556,846	6,110	10.97	342	251	159	8	....	28	36	33	75	75

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Concluded.

General Diseases.									Diseases of Respirato'y System.												
Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
....	....	7	......	1	....	1	....	5	1	....	....	....	....	....	....	....	....	1	....	....	....
....	....	......	......	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	1
....	1	......	1	....	....	4	4	3	2	4	2	1	....	....	....	....	....	3	....	1	....
....	....	1	......	....	....	....	2	2	1	1	2	....	1	....	....	....	....	1	2	1	....
....	....	3	......	....	....	....	....	2	....	....	1	1	2	....	....	....	1	1	....	....	....
....	....	1	......	....	....	....	1	1	....	....	....	....	....	....	....	....	....	1	....	....	....
....	....	......	4	3	....	....	9	7	....	....	....	6	....	....	....	....	....	....	....	....	....
....	....	......	......	....	....	....	1	1	....	....	....	....	....	....	....	....	....	1	....	....	....
....	....	4	2	....	....	....	1	....	2	....	1	....	....	....	....	....	....	2	3	17	....
....	....	......	......	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
....	1	......	2	....	....	1	2	4	1	....	2	1	....	....	....	....	....	....	....	....	1
....	....	1	......	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	....	....	....
51	59	573	116	285	27	204	639	808	457	143	446	373	59	9	30	5	147	486	381	293	213

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907.

Townships.	Population.	Total Deaths.	Annual Rate per 1000.	Age.		General Diseases.							
				Under One.	One to Five.	Typhoid, Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.
Adams—													
Jefferson	3,946	18	4.56	2	1						2		2
Wayne	1,204	20	16.61										
Allen—													
Richland	1,839	13	7.07	1									
Spencer	1,142	8	7.01		1							1	
Ashland—													
Green	1,206	13	10.78	3									
Jackson	923	8	8.67		1								
Lake	684	5	7.31	1									
Milton	869	7	8.06			1							
Mohican	1,123	2	1.78		1								
Orange	1,201	13	10.82	2									
Ruggles	630	5	7.94	1									
Sullivan	808	10	12.38	2									
Troy	583	10	17.15			3							
Vermillion	1,230	10	8.13										
Ashtabula—													
Andover	719	11	15.30										
Ashtabula	1,038	23	22.16	6									1
Cherry Valley	643	13	20.22										
Colebrook	773	8	10.35										1
Denmark	703	2	2.84										
Geneva	1,254	11	8.77										
Harpersfield	893	11	12.32										
Kingsville	1,412	15	10.62	1			1				1		
Lenox	742	5	6.74										
Morgan	562	11	19.57	2							2		
New Lyme	837	10	11.19									1	
Orwell	981	16	16.31										
Plymouth	723	8	11.06		1	1							
Richmond	848	13	15.33										
Wayne	685	7	10.22	2									
Williamsfield	900	16	17.78			1							
Athens—													
Alexander	1,173	9	7.67										
Bern	1,660	5	3.01									1	
Carthage	1,136	5	4.40			1							
Dover	1,488	34	22.85	7	2	1					1	3	
Rome	1,767	12	6.79		3							3	
York	3,762	51	13.56	18	10				1			4	
Auglaize—													
German	893	11	12.32										
Jackson	731	1	1.37										
Noble	1,360	11	8.09	1	1	1							
Pusheta	1,275	11	8.63										
Salem	959	4	4.17	1	1						1		
Union	1,666	17	10.20	1	1				1				
Belmont—													
Goshen	2,049	26	12.69										1
Mead	1,726	10	5.79								1		
Washington	1,540	7	4.55		1					1		1	
Wayne	1,415	8	5.65										
Brown—													
Byrd	1,135	11	9.69	1									
Huntington	1,861	7	3.76		1								
Jackson	924	6	6.49						1			1	
Jefferson	618	11	17.80	3	1								
Washington	1,313	25	19.04	1	2	2							
Butler—													
Lemon	1,825	1	.55										
Milford	1,176	10	8.50	2									
Oxford	1,562	11	7.04		2					1			

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907.

General Diseases.									Diseases of Respirato'y System												
Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito-Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	External Violence.	Still Births.
2		2					1	2	2								1	2	2		
			4						2			1	1					5	1	6	
		1					1	4		1	1							4	1		
							1	2										2	1	1	
							3	3				2	1					1	1	2	
							1	1	1			1						2	1	1	
									2		1	1						1			
							3		1		1	1									
												1								1	
		2			1		3		1	1	3	1						1			
		1								1	1									2	
			1					1	1							1	1	5			
							1		2		1							2		1	
1		1		1			1	2				1						2		1	
							3	4			1	1						1	1		
		2	1	1		2	2	2	4		4	2					1	1			2
		1	1				1	1	1		2	1						4	1		1
		1	1			2			1								1	1			
									1								1				
		2		2			2	2	1									1	1		
1		1					2	3	2										1	1	
		2		1			1	2	1									6			
		2		1			1				1										
		1						3	1									1	1	2	
							3		1									5			
			4	1		4		4	1			1			1						
1						2		1											1	2	
		2		2				2	2			3					2				
		1						1	1			1						1	1		
				2			3	1	2		3	1					1	2			
		1		2			2	2									2				
				1															3		
		1	1			1	1														
		3	1	1			1	1	3	1	10					1	1	2	4		
			1	2				1							2		1			2	
		4					5	2	9	3	3	4	1				2	1	11	1	4
		3		1			2	2			1	1						1			
									1												
		3					2		1		2							2			
		6			1						1						1	2			
									1									2			
		1	2	1	1	5		1			3	1							1		1
		6		2			2	2	5		3	1	1					1		2	
				1			1		1		1	2							3		1
				1				1	1		1	1									
		1						1			1							4	1		1
		2		1			1	1	1		2	1						1			1
		1					1				1							2	2		
		1										1						1		1	
		1			1		4	1									2	2			
		9		1	1		2	3	7												
				1																	
							5					2						1		2	
			1				1	2	1		1							1	1		[illegible]

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

Townships.	Population.	Total Deaths.	Annual Rate per 1000.	Age. Under One.	Age. One to Five.	General Diseases. Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.
Reiley	1,113	9	8.09	1								1	
St. Clair	1,388	21	15.13	9	3								
Carroll—													
Brown	1,345	11	8.18		1							2	
East	606	7	11.55		1								1
Lee	849	9	10.60										
Monroe	841	4	4.76			4							
Champaign—													
Concord	1,053	6	5.70							1			
Harrison	744	7	9.41										
Wayne	1,345	3	2.23										
Clark—													
Bethel	2,100	3	1.43	1	1	1					1	1	
Harmony	1,830	12	6.53	1									
Mad River	1,552	10	6.41	1	1								
Pleasant	1,2 6	5	4.15										
Springfield	3,698	17	4.71										
Clermont—													
Miami	2,385	29	12.16	3	1	2							
Washington	1,541	9	5.84			1	2						
Wayne	1,537	5	3.25										
Clinton—													
Adams	754	1	1.33		1								
Jefferson	1,040	18	17.31		1	1				1		1	1
Marion	860	8	9.30										
Richland	1,289	19	14.74										2
Wayne	1,149	7	6.09	2									
Wilson	898	6	6.68	1		1							
Columbiana—													
Butler	1,523	23	15.10			2							1
Hanover	1,455	12	8.25										
Middleton	1,797	16	8.90		3								
Perry	1,124	15	13.35	3									
Salem	1,637	5	3.05										
Coshocton—													
Adams	968	4	4.13			1							
Bethlehem	730	4	5.48		1								
Franklin	1,137	7	6.16	2	5	1				3			
Jackson	1,696	4	2.36										
Jefferson	806	1	1.24										
Linton	1,215	12	9.88										
Monroe	909	7	7.70	1									
Oxford	1,031	5	4.85										
Tiverton	876	4	4.57		1							1	
Tuscarawas	1,866	6	3.22			1							
White Eyes	1,033	20	19.36										
Crawford—													
Chatfield	1,006	8	7.95	2	1						1		
Dallas	465	3	6.45										
Holmes	1,500	20	13.33	2									1
Jefferson	697	6	8.61			1							
Liberty	1,566	8	5.11										
Sandusky	569	3	5.27		1								
Texas	516	7	13.57										
Tod	882	5	5.67		1	1							
Vernon	926	3	3.24									1	
Cuyahoga—													
Bedford	1,140	2	1.75		2					1		1	
Brecksville	1,053	14	13.30										
Dover	2,233	15	6.72	1									
Euclid	2,634	24	9.11	3	1						1		
Mayfield	849	5	5.89			2							

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

General Diseases.									Diseases of Respirato'y System.												
Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
				3			3				1		1								
	1					1	5	3	2	1	5							3			2
			1			1	2				1						1		2	1	
							3	1			1								1		
			1		1						1	2						1	2	1	
							3	2													
				1			1					1					3	1			
											1							2			
			1				2	1	1	1	2	4									
							1	2	3							1	1	1		1	
									2		1		1							1	
		3				11													3		2
			3	1		1	4	7	4		3				2			1	1		4
					2				1		1	1						1			
1		1					1		1											1	
											1										
	1	3	1					2	1									5	1		
		1						2	1		1							3			
		3				5	3										3	3			
					1		1		1		2						1	1			1
								1					2					2			
		2		2				3	3		1	1			4		1	2	1		2
		1	1			2		3										5			8
				2			2	1	1		5	2						2		1	
		1					1		1	2	1	2						2	1		2
						2	1	1										1			
1					1														1		
		1						1										1	1		
						1						1					1				
					1						1							1		1	
		1																			
		2				1	1	1		1		1						3	1		1
1							1	1	1		1							1	1		
						1	1					1			1			1			
							1				2										
									1									3		1	4
		2					4	2	2		2	1	2				1	2		2	3
							2	1			2							1		1	
		1				1	1														1
		1					3	4				2	1					5	3		
									1									2		2	
							1		1		1	1						1	2	1	
									1									1	1		
			1						1								1	2	1	1	
							3	1													
														1				1			
							1	3	4	2								2	1	1	
			1	1				2		2		1					1	4	3		
	1	4		1				2	3	1	1							2	4	4	
								1	1										1		

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

Townships.	Population.	Total Deaths.	Annual Rate per 1000.	Age.		General Diseases.							
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.
Royalton	1,128	8	7 09										
Solon	903	10	11.07	1		1						1	
Strongsville	1,178	16	13.58										
Warrensville	1,634	3	1.84									1	
Darke—													
Butler	1,659	11	6.63	2		2							
Franklin	1,635	5	3.06										
German	1,376	7	5.09	1									1
Greenville	2,940	35	11.90	4	3				1			1	
Harrison	1,212	7	5.78										
Jackson	1,516	9	5.94			2				3			
Patterson	1,475	15	10.17	2	2								1
Richland	1,217	9	7.40										
Twin	1,448	20	13.81	1		1							1
Wabash	1,334	11	8.25		4							1	
Washington	1,343	7	5.21										1
Wayne	1,371	11	8.02										
York	942	3	3.18	1		1							
Defiance—													
Mark	1,685	4	2.37	2							1		
Richland	1,444	1	.69		1							1	
Tiffin	1,514	15	9.91										
Delaware—													
Berlin	1,043	9	8.63		1							1	
Delaware	1,000	7	7.00	1		1							
Genoa	922	1	1.08										
Harlem	1,005	7	6.97			2							
Kingston	629	8	12.72										2
Orange	976	10	10.25										
Scioto	1,194	18	15.08										
Thompson	709	2	2.82										
Erie—													
Oxford	950	6	6.32										
Fairfield—													
Berne	2,031	6	2.95								1		
Madison	1,127	12	10.65	4									1
Richland	956	11	11.51	3									
Rush Creek	1,309	9	6.88			1							
Fayette—													
Concord	733	4	5.46			1							
Green	701	1	1.43										
Madison	1,317	6	4.56										
Marion	932	8	8.58		1								
Franklin—													
Hamilton	1,474	4	2.71										
Jackson	1,633	5	3.06	1	1								
Perry	1,676	6	3.58			3						2	
Plain	939	16	17.04	1								1	
Sharon	1,356	2	1.47										
Washington	964	11	11.41		1	1							
Fulton—													
Dover	1,171	10	8.54										
Royalton	1,198	6	5.01										
Gallia—													
Cheshire	1,851	9	4.86	2									
Green	1,257	11	8.75										
Huntington	1,277	1	.78									1	
Morgan	1,232	7	5.68	1									
Raccoon	1,273	1	.79							1			
Springfield	1,844	15	8.13			1			1				
Walnut	1,687	6	3.56			1							

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

General Diseases.									Diseases of Respirato'y System.												
Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
		1							1			1					2	2	1		
							1		1									3	2	1	
								4			1	3	1		1		2	4			
									1		1										
			1	1			1	2		1		1							1	1	
		1					1	1			1							1			
							1	1	1		1									2	1
		4	1	1	1	3	5	5	1	2	3	3						1	1	2	1
1		1															1	1			
1			1	1		5	2		2												
		2		1		4		2													
1		1		1			4	2	3		2						1	2	1		
		1	1	1			1		1		3	1							1		
		2		1		1		1			1										
		2				2	1	3	1			2									
							1											1			
																	1		1	1	
		1		1			2	5	3				1						1	1	
				1			1					2						2		2	
		1		1			1	1			1	1									
			1																		
								2										2		1	
									2			1						3			
		2					2		2		1							1	1		
		2		1			1	1			2	1						2	1	7	
									1									1			
				2			1		1		1							1			
				1				1	2			1									
1		1		1			1	2	1		1	1					2				2
		1		1			1	2	1								3	2			2
								3	2	1										2	1
								1	2												
		1																			
				1			1		1	2								1			1
1				2			1				1	1						2			
							1		2											1	
		1				1	1		1		1										
						1															
				1	1		1	2			3	2						2	1	2	
												2									
			1				4	1			1								3		2
		2						3											1		
		2		2							3						2				
						1		1	3	1			1					3	1		
		1		1		1	1	2										1			
		5						4	2									2			
									1									4			

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

Townships.	Population.	Total Deaths.	Annual Rate per 1000.	Age. Under One.	Age. One to Five.	General Diseases. Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.
Geauga—													
Bainbridge	758	9	11.87										
Chester	716	10	13.97	1							1		
Claridon	764	13	17.02	2					1				
Hambden	603	4	6.63										
Huntsburg	809	8	9.89										
Munson	780	11	14.10		1								
Newbury	955	4	4.19						1				
Parkman	849	9	10.60										
Russell	695	5	7.19										
Thompson	909	14	15.40	1	1								
Greene—													
Caesar Creek	1,039	9	8.66			2							1
Cedarville	1,278	12	9.47			4							
Jefferson	1,158	12	10.36	2	6								
Ross	1,141	7	6.14										
Silver Creek	1,109	16	14.43										
Spring Valley	938	10	10.66	1									
Guernsey—													
Adams	717	7	9.76		1								
Center	1,821	17	9.34	1	1								
Jackson	1,898	1	.53			1							
Knox	845	7	8.28			1							1
Liberty	1,054	13	12.33		3								
Madison	883	5	5.66										
Oxford	1,061	12	11.31	2	3								
Hamilton—													
Anderson	3,753	18	4.80		1							1	1
Columbia	2,398	16	6.67		1						2		
Crosby	883	19	21.52		2	2							
Green	4,532	29	6.40			1							1
Harrison	636	6	9.43							1			
Millcreek	5,304	27	5.09	3									
Spencer	257	4	15.56										
Springfield	3,929	32	8.14	4	1							1	1
Whitewater	1,291	6	4.65										
Hancock—													
Allen	987	4	4.05										
Biglick	1,156	4	3.46			2							
Blanchard	933	6	6.43							1			
Liberty	1,486	11	7.40							6			
Madison	1,009	10	9.91	3									
Marion	1,079	4	3.71		1								
Pleasant	1,503	10	6.65	1									
Van Buren	789	8	10.14	1									
Hardin—													
Blanchard	804	28	34.82										
Goshen	953	4	4.20			1							
McDonald	1,947	4	2.05									1	
Washington	1,834	8	4.36										
Harirson—													
Archer	700	2	2.86										
Franklin	677	8	11.82										
German	1,203	11	9.14										
Monroe	955	17	17.80	1	1							1	2
Moorefield	1,222	15	12.27		1	1							
Rumley	843	21	24.91	1	1	1							
Stock	591	1	1.69										
Washington	1,247	14	11.23	1									
Henry—													
Bartlow	1,430	4	2.80										
Flatrock	1,359	13	9.57			1						1	
Harrison	1,232	6	4.87	1									

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

General Diseases.							Diseases of Nervous System.	Diseases of Circulatory System.	Diseases of Respiratory System.		Diseases of Digestive System.	Diseases of Genito-Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.			Pneumonia.	Other Respiratory Diseases.											
		2		1			2				1							3			
						1		2	2	2								2			
		1		1		3	2				1			1				3			
								1									1	1		1	
		1		1				1	1									1	2		
							1	1			2	1						6			
								1										1	1		
		1				3		1	1									1		2	
							1	1	1									2			
			1					1			1		1				1	8	1		
				1			1	3	1												
							1				1			1				5			
3				1			2	3		1				1				1			
				1						2	1							3			2
1				3			3	3	1			1						3	1		1
							1	1			1	4					1	2			
		2				1		1	1		1								1		
		2						1	1		2	1				2			6	2	
		1					1	1										2			
3			1				2	2					2					1	2		
								1										4			
		1					4	1	1		1				1					3	2
		2	1				1		5	1	2	4									
		1						2	4	3			1					2		1	
		5		1			2			3	2						4				
	3		3	1			4	3			3	3	1					4	1	1	
							1	2				1							1		
			2				3	8	3		2	3						4		2	
						1		2											1		
		1	4			16	1					1					4	2	1		
				1		3					1						1				
																		1		3	
							1											1			
	1					1	1				1							1			
				1			1											1		2	
		1		1		1	2	4			1										
											1							3			
		5	1								1							1	2		1
1		2					1		1	1								1		1	1
	1	5		1			7	4	2		3	2	1					1	1		3
		1		1															1		
																		3			
		1		1								1						4		1	
							1											1			
			1			1		3	1									2			
				1		1		4	1			1						2	1		
			1	1		2	2	4			2						1		1		
				1		3	1	3	1	1	1							2	1		
	1	3				1	4	3			2	1				1		1	1	2	
																				1	
1		2	2				1	1			1	1					1	4			
		2					1												1		
	1	2						2	3		1							2			1
		1	2								1							1	1		2

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

Townships.	Population.	Total Deaths.	Annual Rate per 1000.	Age.		General Diseases.							
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.
Marion	1,568	7	4.46		1	1				1			
Richfield	1,708	5	2.93	1	1				1			1	
Ridgeville	1,241	3	2.42										
Washington	1,188	8	6.73		2								
Highland—													
Hamer	918	3	3.27										
Jackson	912	11	12.06										
Salem	869	5	5.75										
Hocking—													
Good Hope	1,227	3	2.44										
Salt Creek	1,509	15	9.94	4									
Ward	6,022	34	5.65	2	1	2				2	3	5	
Holmes—													
Mechanic	1,213	4	3.30		1								
Richland	1,023	9	8.80	1		1							
Paint	1,179	4	3.39										
Salt Creek	1,355	16	11.85			1							
Washington	1,019	8	7.85			1							
Huron—													
Bronson	824	10	12.14		1								
Clarksfield	1,051	16	15.22	4									
Fairfield	1,116	3	2.69							3			
Fitchville	475	5	10.53										
Greenfield	706	14	19.83			1							3
New London	653	7	10.72										
Townsend	977	8	8.19										
Jackson—													
Bloomfield	1,006	12	11.93		1								
Liberty	1,456	3	2.06										
Lick	1,326	11	8.30		1								
Madison	1,338	39	29.15			5						3	7
Milton	2,304	1	.43		1							1	
Washington	1,151	8	6.95			2							
Jefferson—													
Ross	617	4	6.48										
Salem	1,686	4	3.68										
Smithfield	1,434	3	2.09			1				1		1	
Springfield	1,078	1	.93		1							1	
Wells	1,195	25	20.92		2						1		
Knox—													
Berlin	751	12	15.98			1							
Brown	1,042	3	2.88										
Butler	694	3	4.32										
College	232	5	21.55										
Harrison	588	6	10.20			1							
Hilliar	635	5	7.87										
Jackson	798	8	10.03										
Monroe	807	4	4.96										1
Morgan	650	8	12.31	3									
Pike	1,163	1	.86							1			
Pleasant	818	5	6.11	1									
Lake—													
Concord	706	3	4.25										
Kirtland	1,134	3	2.65										
Leroy	678	3	4.42										
Madison	1,952	19	9.73			1							2
Painesville	1,853	4	2.16	1									
Perry	1,687	13	7.71									1	
Lawrence—													
Decatur	1,063	10	9.41			1					3	2	2
Hamilton	659	2	3.03										
Perry	1,821	13	7.14										

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

General Diseases.									Diseases of Respirato'y System.												
Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
							1	1	1	1									1		
1		1					1														
							1	1											1		
				1		2						1			2					2	
												1	1					1			
							1	4			3	1					1			1	
		1	1						2									1			1
							1													1	
		1						2	1		6	2						2	1		
		2		2				1	4		1	1	1			1	3	1	3		2
							1		1			1							1		
		2					2	2	1										1		
				1			2				1										
					1		4	2			3	1	1				2			1	
		1							1				1		1		1	2			
		1		1	1		3	1	1									2			
		3		3		2	2		1			1				1	2	1			
						1			1		3										
							1	1		1		1		2				3		1	
							1					1						3	2		
			2			1	1	2	1									1			
1		2	3	1		1		2										2			
				1														1		1	
		1					1	1	1	1	2	1							1	2	
				2					6	2	4							8			
			1			1	1	1										2			
								2										1		1	
											1							1		2	2
							4	6	6	1	1								4	2	
								2	2		2		1					3	1		
				1								1						1			
									3												
		2							1		1							1			
			1		1			1	1									1			
			2														1	2			
2						1					1	1						2		1	
									1			2									
		1				1	4	1	1												
		1				2					1									1	
				1														1		1	
			1						2												
					1													2			
				3			2	2	1		4							1	3		
							2											1		1	
				1				3	1			1						3	2	1	
						2															
												1							1		
						8			3	1									1		

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

Townships.	Population.	Total Deaths.	Annual Rate per 1000.	Age.		General Diseases.							
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.
Rome	2,776	3	1.08			2							
Upper	1,831	11	6.01		2	2						2	
Licking													
Bowling Green	808	4	4.95										
Burlington	922	5	5.42										
Eden	620	1	1.61										
Etna	955	11	11.52	1	2								
Fallsburg	836	7	8.37										
Jersey	1,081	5	4.63										
McKean	824	10	12.14	3		1					1		
Perry	807	5	6.18	1	1								
St. Albans	766	6	7.83										
Logan—													
Liberty	578	3	5.19									1	
McArthur	940	6	6.38										
Perry	1,047	20	19.10	3	1								
Pleasant	978	7	7.16										
Union	774	6	7.75										
Lorain—													
Black River	337	1	2.97										
Brighton	490	7	14.29		3								
Brownhelm	1,100	7	6.36										
Grafton	848	8	9.43										
Penfield	618	5	8.09										
Pittsfield	782	10	12.79	4									
Ridgeville	1,575	2	1.27										
Russia	981	7	7.14										1
Lucas—													
Adams	2,090	18	8.61	3	1								1
Providence	1,270	15	11.81	2	1								
Richfield	1,136	8	7.04	1									
Spencer	769	8	10.40	3									
Sylvania	1,270	18	14.17										1
Madison—													
Canaan	881	3	3.41		1								
Deer Creek	882	18	20.41	3		1							
Mahoning—													
Canfield	856	8	9.35										
Coitsvile	1,815	9	4.96		2				1	1	1		
Ellsworth	663	8	12.07	1									
Goshen	1,406	9	6.40										
Green	1,489	9	6.04	3									
Milton	657	4	6.09										
Smith	2,136	24	11.24						2			1	
Springfield	2,137	17	7.95										
Youngstown	3,161	20	6.33	3	2								
Marion—													
Big Island	1,342	2	1.49										
Bowling Green	978	8	8.18	2									
Grand	499	2	4.01								1		
Montgomery	926	13	14.04	3		1							
Pleasant	1,109	20	18.03			2							4
Prospect	850	4	4.71	1									
Scott	549	3	5.46										
Tully	877	7	7.98	1									
Waldo	644	1	1.55										
Medina—													
Chatham	904	5	5.53	1	1								
Harrisville	987	5	5.07										
Hinckley	840	13	15.48										
Litchfield	760	5	6.58			1							
Medina	671	8	11.92	1	2					1			

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

General Diseases.							Diseases of Nervous System.	Diseases of Circulatory System.	Diseases of Respirato'y System.		Diseases of Digestive System.	Diseases of Genito-Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.			Pneumonia.	Other Respiratory Diseases.											
									1												
		1	2						2			2									
																		3	1		
								2					1		1			1			
																				1	
							2		1			1					1	1	3	2	
							2	1										3			
						1			1		1		1					1			1
1		1						2	1					1			2				
		1					1	1			1						1				
		3						3													
		1																1			
								2	3		1										
		4					5	2	1			3	2					2		1	
			1			1	2					1						2			
						2	1				1							1		1	
																		1			
						2	1		1	1	1							1			
			1	1		1	1				1							2			
				1					2			3						1	1		
							1										1	2	1		
							3		1	1		2					2	1			1
		1									1										
							2	4													
							4	5	1		1						4	1	1		5
		1		1			1	2	2		2	1						1	1	3	
1			1				2				1	1							1	1	
		1					4			1	1							1			
		3				2	5	1	3		1	1								1	2
		1	1				1														
		1					1	3	1		3	2					1	5			
		1		1			2			2	1								1		
				1			1	2										2			
	1		1				1		3								1	1			
		1		1			1	2			1								2	1	
									4			1					3		1		
									2			1							1		1
1		2		1		4	1	3	2		2							3	1	1	
				1			6	3	3		2							1		1	
			2				2	1	3	2	4	3						1	1	1	
					1			2	1		1			1				1		1	
																		1			
							1	1	2		2	2						3	1		
				1			2	4			2							4		1	
		1					1	1	1												
1				1			1														
		3					1		1										2		
											1										
								3	1									1			
	1							1										3			1
	2							3		1		1		1			2	1	1	1	
							1					1						1		1	2
				1			2		1			1						1	1		

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

Townships.	Population.	Total Deaths.	Annual Rate per 1000.	Age.		General Diseases.							
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.
Montville	743	9	12.11										
Spencer	963	15	15.58		1	1							
York	983	5	5.09										
Meigs—													
Chester	1,597	7	4.38										
Columbia	1,016	12	11.81										
Scipio	1,382	9	6.52			1							
Mercer—													
Butler	1,368	10	7.31		1							8	
Liberty	1,733	4	2.31		1	1							
Marion	2,368	15	6.33										
Washington	1,487	3	2.02										
Miami—													
Concord	1,306	10	7.66							3			
Monroe	1,228	5	4.07										
Newton	1,980	15	7.58										
Spring Creek	1,422	12	8.44	1									
Staunton	1,184	5	4.22										
Washington	997	14	14.04			1							
Monroe—													
Bethel	1,087	2	1.84	2		1				1			
Jackson	1,659	1	.60		1							1	
Ohio	1,751	6	3.43										
Montgomery—													
Clay	2,539	6	2.36										
German	1,658	41	24.73										
Harrison	3,837	21	5.47	1	1							1	
Mad River	2,310	7	3.03										
Randolph	2,075	19	9.16	2		10							
Morgan—													
Center	953	14	14.69			1							
Deerfield	839	7	8.34									1	
Homer	1,426	11	7.71									2	
Malta	825	11	13.33							9		1	
Manchester	585	10	17.09	1	1								
Meigsville	1,078	6	5.57										
Penn	1,007	14	13.90										
Union	1,272	2	1.57									1	
Windsor	1,745	20	11.46		2					1			
York	751	11	14.65										
Morrow—													
Bennington	777	5	6.43										
Canaan	1,024	3	2.93										
Congress	983	9	9.16		1								
Franklin	838	1	1.19		1							1	
Harmony	711	8	11.25										
North Bloomfield	960	9	9.37										
Perry	935	6	6.42	1									
South Bloomfield	742	4	5.39	3									3
Troy	641	7	10.92										
Westfield	948	4	4.22										
Muskingum—													
Cass	977	24	24.56	1	1	1						3	1
Falls	1,680	5	2.98			2							
Highland	674	2	2.97										
Jackson	816	2	2.45										
Jefferson	73	1	13.70		1							1	
Licking	830	4	4.82		1						1		
Madison	900	3	3.33										
Meigs	1,291	19	14.72							1			
Monroe	813	5	6.15										
Newton	1,883	3	1.60	1	2							2	

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

General Diseases.									Diseases of Respirato'y System.												
Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
....	....	1	....	....	....	....	2	1	....	....	....	2	....	....	....	....	2	....	....	1	....
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....	....	1	1	....	....	7	1	1	....	....	1	1	....	....	....	....	....	2	....	....	....
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....	1	5	....	4	....	....	....	10	5	....	3	3	....	....	....	....	....	10	....	....	....
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ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

Townships.	Population.	Total Deaths.	Annual Rate per 1000.	Age.		General Diseases.							
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.
Salt Creek	1,024	11	10.74										1
Springfield	1,504	3	1.99									1	
Wayne	1,624	7	4.31										
Noble—													
Buffalo	1,033	11	10.65									1	
Elk	1,357	6	4.42	2									
Jefferson	1,005	5	4.98	1		1						1	
Seneca	934	4	4.28			1							
Stock	1,121	1	.89									1	
Ottawa—													
Benton	2,341	17	7.26		8				1	1		1	
Carroll	1,734	6	3.46	1		2							
Harris	1,176	7	5.95										
Put-in-Bay	723	4	5.53										
Paulding—													
Blue Creek	1,967	18	9.15	5	2	1					1		
Brown	1,700	6	3.53			1							
Jackson	1,932	2	1.04										
Latty	1,901	19	9.99	1	2								1
Perry—													
Bearfield	923	3	3.25	1	1				1		1		
Coal	837	12	14.34	1	1	2						2	
Jackson	1,228	7	5.70			1							
Monday Creek	868	11	12.67	1	1								
Monroe	3,264	40	12.25		1	1						2	
Reading	1,843	17	9.22										
Pickaway—													
Deer Creek	1,126	6	5.33										
Jackson	1,205	8	6.64	2	2								
Madison	794	4	5.04										
Monroe	1,410	10	7.09	2									
Pickaway	1,231	9	7.31										
Salt Creek	1,292	14	10.84	1		1							
Washington	1,050	8	7.62	1		1							
Wayne	659	2	3.03										
Pike—													
Jackson	2,021	19	9.40	1	1								
Marion	786	10	12.72										1
Sunfish	1,068	9	8.43		1								
Portage—													
Charlestown	688	5	7.27	1									
Deerfield	1,101	21	19.07	1									
Freedom	670	1	1.49										
Hiram	704	9	12.78										
Palmyra	1,224	11	8.99										
Ravenna	990	14	14.14										
Streetsboro	672	8	11.90		1								
Preble—													
Dixon	978	11	11.25	3						1			1
Gratis	1,351	18	13.32	1	1								1
Harrison	2,218	5	2.25		1								
Israel	1,257	15	11.93		3								1
Washington	1,720	12	6.98										
Putnam—													
Jackson	1,308	2	1.53										
Monterey	1,342	6	4.47										
Perry	1,366	6	4.39										
Union	997	5	5.02	1									
Richland—													
Blooming Grove	978	6	6.13	2									
Butler	765	15	19.61										
Jackson	841	3	3.57										

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

General Diseases.									Diseases of Respirato'y System.												
Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
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ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

Townships.	Population.	Total Deaths.	Annual Rate per 1000.	Age.		General Diseases.							
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.
Jefferson	1,293	6	4.64										
Monroe	1,224	8	6.58	3		1							
Sandusky	598	4	6.69										
Springfield	1,373	8	5.83			1							
Ross—													
Concord	2,240	47	20.98	10	3								
Harrison	1,162	5	4.30	1									
Springfield	1,133	8	7.06		2				1				
Twin	1,899	10	5.26										
Union	2,317	4	1.73		1				1				
Sandusky—													
Green Creek	1,591	3	1.89										1
Jackson	1,600	10	6.25		2								
Madison	1,492	17	11.39	3	2	1			1			1	1
Townsend	1,567	12	7.66		1								
Scioto—													
Bloom	1,713	21	12.26	3							3		
Green	1,332	12	9.01		3	2							
Rarden	1,140	14	12.28		4						1	2	1
Washington	1,269	9	7.09			2							
Seneca—													
Big Spring	1,618	15	9.27		1								
Liberty	1,459	11	7.54		1						1	2	
Pleasant	1,447	1	.69									1	
Thompson	1,545	9	5.83	1	1				2				
Shelby—													
Clinton	1,149	10	8.70	2								1	
Cynthian	1,402	7	4.99					1					
Franklin	840	2	2.38										
Salem	1,072	5	4.66									5	
Van Buren	1,531	4	2.61										
Stark—													
Canton	3,341	11	3.29	5		1							
Jackson	2,090	10	4.78	1	3	2							
Lake	2,312	4	1.73		4					4			
Lawrence	2,972	61	20.52			7							
Lexington	1,195	19	15.90	1									
Nimishillen	1,839	15	8.16		2					1			
Paris	1,727	15	8.69	1	1								
Perry	3,205	14	4.37		2	1							
Pike	1,491	15	10.06			1							
Plain	3,624	22	6.07	2		1							
Sandy	637	5	7.85										
Sugar Creek	1,836	6	3.27			1							
Tuscarawas	4,139	35	8.46	6	1	1							
Summit—													
Boston	689	4	5.81										
Copley	802	15	18.70			1							
Franklin	2,024	16	7.91	1	1						1		
Green	1,602	9	5.62			2							
Northampton	814	6	7.37										
Northfield	1,050	13	12.38		2								
Norton	1,674	15	8.96	2	1								
Richfield	930	6	6.45										
Tallmadge	1,363	15	11.01			1							1
Trumbull—													
Bazetta	706	6	8.50	2		1							
Braceville	867	7	8.07										1
Bristol	1,035	5	4.83	1									
Fowler	764	15	19.63	1									
Greene	841	7	8.32										
Gustavus	844	9	10.66	2					1				

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

General Diseases.									Diseases of Respirato'y System.												
Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito-Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
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ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

Townships.	Population.	Total Deaths.	Annual Rate per 1000.	Age. Under One.	Age. One to Five.	General Diseases. Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.
Hartford	1,195	11	9.21			1							
Johnston	753	8	10.62										1
Liberty	1,595	18	11.29	1	1								
Lordstown	722	6	8.31				1						
Newton	625	3	4.80										
Vernon	824	9	10.92			1							
Vienna	942	7	7.43										
Warren	1,060	7	6.60										
Tuscarawas—													
Bucks	1,223	5	4.09								1		
Franklin	962	10	10.39	1	1								
Mill	1,549	7	4.52		2						1		
Oxford	851	6	7.05										
Rush	1,094	6	5.48										
Union	825	9	10.91									2	
Warwick	1,632	12	7.35	3	2	1					1		
Washington	784	10	12.75										
Wayne	1,132	12	10.60	3									
York	1,027	7	6.82			1							
Union—													
Allen	957	9	9.40										
Claibourne	1,401	13	9.28										
Jerome	1,307	4	3.06		1								
Millcreek	688	6	8.72										
Washington	1,186	5	4.22										
Van Wert—													
Harrison	1,445	13	9.00	4									
Hoaglin	1,608	3	1.87										
Jackson	1,238	6	4.85	1									
Pleasant	1,336	7	5.24	1									
Tully	1,736	1	.58										
Vinton—													
Brown	746	5	6.70	1									
Clinton	1,010	7	6.93		1							1	
Eagle	1,073	7	6.52	3									
Madison	654	2	3.06		1	1						1	
Swan	979	5	5.11			1							
Vinton	1,336	8	5.99	1	2		1					1	
Warren—													
Franklin	1,791	13	7.26										
Hamilton	1,693	6	3.54										
Massie	735	4	5.44										
Union	555	10	18.02			1			1				
Washington	1,062	4	3.77		1								
Washington—													
Aurelius	806	9	11.17		1								
Belpre	2,761	37	13.40										
Fairfield	758	10	13.19		2								
Independence	1,632	4	2.45										
Lawrence	1,726	5	2.90	1	2							2	
Warren	1,813	11	6.07			1							
Waterford	1,557	15	9.63	1	1								
Wayne—													
Congress	1,485	3	2.02		2					3			
East Union	1,418	9	6.34										
Green	1,616	15	9.28										
Paint	1,044	3	2.87										
Plain	1,666	5	3.00		1								
Sugar Creek	1,608	11	6.84			1							
Wooster	1,097	15	13.68	1	3							1	
Williams—													
St. Joseph	1,090	5	4.59	1	1								
Springfield	1,135	7	6.17	1									

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Continued.

General Diseases.									Diseases of Respirato'y System.												
Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases	Diseases of Digestive System.	Diseases of Genito-Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
		1						1	1		2	1			1			1	1	1	
		1					2											4			
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		3				1	1	2			1							2			
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		1				6	1	1			1									4	
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ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Concluded.

Townships.	Population.	Total Deaths.	Annual Rate per 1000.	Age.		General Diseases.							
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.
Wood—													
Freedom	1,184	11	9.29	1					1				
Henry	1,900	6	3.16			1							
Lake	1,703	7	4.11	1	1						1		
Montgomery	1,637	14	8.55	1	1	1							
Plain	1,120	1	.89		1							1	
Ross	1,133	13	11.47		4								
Webster	1,303	11	8.44	2									
Wyandot—													
Antrim	1,081	5	4.63		1								
Crawford	970	9	9.28		5					5			
Marseilles	746	6	8.04										
Mifflin	1,067	4	3.75										
Richland	1,036	5	4.83	1	1								
Total	690,654	5,196	7.52	321	245	163	5	1	21	60	39	109	63

ABSTRACT OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907 — Concluded.

General Diseases.									Diseases of Respiratory System.												
Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito Urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
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52	35	389	108	213	34	231	519	588	402	91	335	269	50	15	19	12	156	666	269	228	127

ABSTRACTS OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907.

	Population.	Total Deaths.	Annual Rate per 1000.	Age.		General Diseases.										
				Under One.	One to Five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.	Purulent and Septicemic Infections.	Pulmonary Tuberculosis.
Cities (61)	2,290,281	31,586	13.79	4,945	1,896	731	18	..	116	167	148	393	240	99	272	3,073
Villages (390)	556,846	6,110	10.97	342	251	159	8	..	28	36	33	75	75	51	59	573
Townships (548)	690,654	5,196	7.52	321	245	163	5	1	21	60	39	109	63	52	35	389
Total	3,537,781	42,892	12.12	5,608	2,392	1,053	31	1	165	263	220	577	378	202	366	4,035

ABSTRACTS OF THE REPORTS OF DEATHS AND THEIR CAUSES DURING 1907.

General Diseases.						Diseases of Respirato'y System			
Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circulatory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Digestive System.	Diseases of Genito Urinary System.
384	1,392	111	1,006	3,681	3,363	3,030	1,175	2,487	2,010
116	285	27	204	639	808	457	143	446	373
108	213	34	231	519	588	402	91	335	269
608	1,890	172	1,441	4,839	4,759	3,889	1,409	4,268	2,652

Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
342	102	62	130	1,358	1,524	2,360	787	1,992
59	9	30	5	147	486	381	293	213
50	15	19	12	156	666	269	228	127
451	126	111	147	1,661	2,676	3,010	1,308	2,332

SUMMARY OF MORTALITY REPORTS.

The total number of deaths reported from all causes — excluding premature and still births — by the cities, villages and townships represented in the preceding tables was 42,892. The population of the cities, villages and townships represented (estimated) was 3,537,781 which is equal to an annual death rate of 12.12 per thousand living population represented.

The deaths in 3,607,389 living population (estimated) in 1906 were 42,830, equal to an annual death rate of 11.87 per thousand; while in 1905 the total number of deaths reported in 3,470,906 population was 37,723, equal to a mortality of 10.87 per thousand.

DEATHS OF CHILDREN UNDER FIVE YEARS OF AGE.

The number of deaths reported of children under five years of age (premature and still born excluded) was 8,000, which is equal to 18.65 per cent. of the deaths from all causes, and a death rate of 2.3 per thousand population represented. The death rate of children under five the preceding year was 2.4 per thousand population represented.

GENERAL DISEASES.

The total number of deaths reported from general diseases was 11,402, which is equal to 26.6 per cent. of the deaths reported from all causes, and an annual rate of 3.2 per thousand population represented.

The number of deaths reported the preceding year for these diseases was 12,154, equal to a mortality rate of 3.4 per thousand of the population represented.

CROUP AND DIPHTHERIA.

The total number of deaths reported from croup and diphtheria was 577, which is equal to 1.3 per cent. of the deaths reported from all causes, and a death rate of .16 per thousand of the population represented.

The number of deaths reported the preceding year from these causes was 774, equal to a mortality rate of .21 per thousand of the population represented.

MEASLES, SCARLET FEVER AND WHOOPING COUGH.

The total number of deaths reported from measles, scarlet fever and whooping cough was 648, which is equal to 1.51 per cent. of the number of deaths reported from all causes, and a mortality rate of .18 per thousand of the population represented.

The total number of deaths reported from these diseases during the preceding year was 647, equal to a mortality rate of .18 per thousand population represented.

TYPHOID FEVER.

The total number of deaths reported from typhoid fever was 1,053, which is equal to 2.46 per cent. of the total number reported from all causes, and a mortality rate of .30 per thousand population represented.

The number of deaths reported from this cause the preceding year was 1,238, equal to a mortality rate of .34 per thousand population represented.

CANCER.

The total number of deaths reported from cancer was 1,890, which is equal to 4.4 per cent. of the deaths reported from all causes, and a mortality rate of .53 per thousand population represented.

The number of deaths reported from this cause the preceding year was 1,845, equal to a mortality rate of .51 per thousand population represented.

PULMONARY TUBERCULOSIS.

The total number of deaths reported from pulmonary tuberculosis was 4,035, which is equal to 9.41 per cent. of the deaths reported from all causes, and a mortality rate of 1.14 per thousand population represented.

The number of deaths reported from this cause the preceding year was 4,301, equal to a mortality rate of 1.19 per thousand population represented.

DISEASES OF THE NERVOUS SYSTEM.

The total number of deaths reported from diseases of the nervous system was 4,839, which is equal to 11.28 per cent. of the deaths reported from all causes, and a mortality rate of 1.37 per thousand population represented.

DISEASES OF THE CIRCULATORY SYSTEM.

The total number of deaths reported from diseases of the circulatory system was 4,759, which is equal to 11.1 per cent. of the deaths reported from all causes, and a mortality rate of 1.35 per thousand population represented.

The number of deaths reported the preceding year from these diseases was 4,163, equal to a mortality rate of 1.15 per thousand population represented.

DISEASES OF THE RESPIRATORY SYSTEM.

The total number of deaths reported from diseases of the respiratory system was 5,298, which is equal to 12.35 per cent. of the deaths re-

ported from all causes, and a mortality rate of 1.5 per thousand population represented.

The number of deaths reported the preceding year from these diseases was 4,970, equal to a mortality rate of 1.29 per thousand population represented.

DISEASES OF THE DIGESTIVE SYSTEM.

The total number of deaths reported from diseases of the digestive system was 4,268, which is equal to 9.95 per cent. of the deaths reported from all causes, and a mortality rate of 1.26 per thousand population represented.

The number of deaths reported the preceding year from these diseases was 4,643, equal to a mortality rate of 1.20 per thousand population represented.

DISEASES OF THE GENITO-URINARY SYSTEM.

The total number of deaths reported from diseases of the genito-urinary system was 2.652, which is equal to 6.19 per cent. of the deaths from all causes, and a mortality rate of .75 per thousand population represented.

The number of deaths reported the preceding year from these diseases was 2,474, equal to a mortality rate of .68 per thousand population represented.

PUERPERAL CONDITIONS.

The total number of deaths reported from puerperal conditions was 451, which is equal to 1.05 per cent. of the deaths reported from all causes, and a mortality rate of .13 per thousand population represented.

The number of deaths reported the preceding year from these causes was 386, equal to a mortality rate of .09 per thousand population represented.

DISEASES OF THE SKIN AND CELLULAR TISSUE.

The total number of deaths reported from diseases of the skin and cellular tissue was 126, which is equal to .29 per cent. of the deaths reported from all causes, and a mortality rate of .036 per thousand population represented.

The number of deaths reported the preceding year from these diseases was 127, equal to a mortality rate of .03 per thousand population represented.

DISEASES OF ORGANS OF LOCOMOTION.

The total number of deaths reported from diseases of the organs of locomotion was 111, which is equal to .26 per cent. of the deaths reported from all causes, and a mortality rate of .031 per thousand population represented.

The number of deaths reported the preceding year from these diseases was 141, equal to a mortality rate of .038 per thousand population represented.

MALFORMATIONS.

The total number of deaths reported from malformations was 147, which is equal to .34 per cent. of the deaths reported from all causes, and a mortality rate of .042 per thousand population represented.

The number of deaths reported the preceding year from these causes was 137, equal to a mortality rate of .038 per thousand population represented.

INFANTILE DISEASES.

The total number of deaths reported from infantile diseases was 1,661, which is equal to 3.87 per cent. of the deaths reported from all causes, and a mortality rate of .47 per thousand population represented.

The number of deaths reported the preceding year from these diseases was 1,505, equal to a mortality rate of .42 per thousand population represented.

OLD AGE.

The total number of deaths reported from old age was 2,676, which is equal to 6.24 per cent. of the deaths reported from all causes, and an annual rate of .76 per thousand population represented.

The number of deaths reported the preceding year from this cause was 2,436, equal to a mortality rate of .68 per thousand population represented.

VIOLENCE.

The total number of deaths from violence was 3,010, which is equal to 7.02 per cent. of the deaths reported from all causes, and a mortality rate of .85 per thousand population represented.

During the preceding year there were 2,493 deaths reported from violence, equal to a mortality rate of .69 per thousand population represented.

ILL-DEFINED DISEASES.

The total number of deaths reported from ill-defined diseases was 1,308, which is equal to 3.05 per cent. of the deaths reported from all causes, and a mortality rate of .37 per thousand population represented.

The number of deaths reported the preceding year from these diseases was 1,403, equal to a mortality rate of .39 per thousand population represented.

PREMATURE AND STILL BIRTHS.

The total number of premature and still births reported was 2,332,

which is equal to 5.44 per cent. of the deaths reported from all causes, and a rate of .66 per thousand population represented.

During the preceding year there were 2,348 premature and still births reported, equal to a rate of .65 per thousand population represented.

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